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PROGRESS REPORT ON THE DEVELOPMENT OF ENVIRONMENTAL CAPABILITIES TO COMBAT DESERTIFICATION AND THE IMPACTS OF DROUGHT IN THE AFRICA REGION.

I. INTRODUCTION

In the attempt to contribute in finding a solution to the problems arising from severe drought conditions and the process of desertification in Africa, the ECA Conference of Ministers of Ministers in April 1982 at Tripoli, Lityan Arab Jamahiriya, adopted resolution 446 (XVII) calling on its member States to make a more concerted effort towards combating desertification in Africa throught the implementation of the United Nations Plan of Action to Desertification which was adopted at the United Nations Desertification Conference (DESCON), held in Nairobi in 1977. Unfortunately, the situation worsened curing the years after 1982 imposing it on the ECA Conference of Ministers to follow it up, at its eighteenth session in 1983, by resolution 473 (XVIII) of April, 1983 which requested the Executive Secretary of ECA to urgently organize a special Scientific Round Table on the climatic situation in Africa in order to examine the problem and propose solutions to it to member states. One of the most important outcomes of the Scientific Round Table which was held in February, 1984, was the Regional Plan of Action to combat the impacts of drought in Africa. This Plan of Action was adopted by ECA Conference of Ministers' resolution 499(XIX) of May, 1984. The other important outcome was resolution 528(XIX) of the same Ministerial meeting of 1984, on the development of meteorological services to combat drought in the region. By this resolution the Executive Secretary of ECA was requested to study with the World Meteorological Organization (WMO) and other concerned United Nations organizations, the feasibility of establishing an advanced centre for meteorology in Africa or any other alternative institutional mechanism that would serve that purpose. After considering the report of the Executive Secretary as requested by that resolution the Conference of Ministers at its twentieth session in 1985 decided by resolution 540(XX) to establish an African Centre for Meterological Applications for Development (ACMAD).

Since the last meeting of the Inter-governmental Regional Committee on Human Settlements and Environment in July, 1985, there have been a number of follow-up activities to implement these resolutions and develop, in the region, environmental capabilities for combating the impacts of drought and control the desertification. This report outlines follow-up activities carried out by ECA within the context of its Environment in Africa programme and those that the Secretariat has carried out in collaboration with other United Nations agencies as well as with governmental and non-governmental organizations, between July, 1985 and January, 1987. The report examines activities at the national, sub-regional and regional levels carried out by some national governments, those by sub-regional and regional governmental and non-governmental organizations as well as by the United Nations system.

I. ECA ACTIVITIES DURING THE PERIOD UNDER REVIEW

Since July 1985, ECA has been involved in a number of activities aimed at assisting member states, in one way or another, to develop capabilities for combating the impacts of drought and to control the process of desertification. It will be recalled that the Third Meeting of the Joint Committee made recommendations for follow-up action in the search for the modalities for establishing an African Centre of Meteorological Applications for Development as decided by resolution 540 (XX) of April, 1985. ECA then continued consultations with the World Meteorological Organization (WMO) and at the WMO Second Technical Committee on the Management of Meteorological Sercices in Africa held in Bujumbura, the Republic of Burundi in November, 1985 at which it was decided that a committee selected on a subregional basis be established to monitor the establishment of the Centre. In October, 1986 ECA in collaboration with WMO also convened an inter-agency meeting in Bujumbura to further discuss the matter with all the agencies concerned.

The Environment Section at ECA provided inputs into a paper on the "Interrealationship between Drought, Desertification and the Economic and Social Crisis in West African countries'. This paper was requested by the West African MULPOC countries at the meeting of the policy organs of the MULPOC in March 1985 and was delivered to the March, 1986 meeting of that MULPOC policy organ as requested, by the Socio-Economic Research and Planning Division.

In November 1985, with the collaboration of UNEP and the African Development Bank, ECA conducted a curriculum development workshop at the ADB headquarters in Abidjan, Republic of the Cote D'Ivoire to work out the modalities for incorporating environmental components in the training programmes of ECA-sponsored institutions in the region. One of the areas covered was on 'Drought and Desertification Control: Social, Economic and Environmental Implications."

The Environment Section is also preparing a publication in collaboration with UNEP and UNSO on Combating Desertification in Africa: national and regional efforts:. This publication is based on the workshop on the same topic that was held in Khartum, Sudan in October, 1982. This publication should be ready in the course of 1987.

As a contribution to efforts to combat the impacts of drought and desertification in the Republic of Somalia, the Environment Section participated in six-man multi-disciplinary mission to that country from 28 October to 5 November, 1985. The main purpose of the mission was to consult with the government, at its request, on the possible areas of assistance in the key sectors of development in the country. The mission examined the prevailing problems, especially those pertaining to the environmental degradation that has led to poor production in agriculture and related sectors. Recommendations were made as to how best ECA could be of assistance to the country in solving these problems.

The Environment Section participated, with UNEP and OAU, in the preparation of the first African Ministerial Conference on the Environment which was held in Cairo in December, 1985. The details of the outcomes of that meeting are reported in a separate document for this joint committee meeting.

In preparation for the Special Session of the General Assembly of the United Nations on the social and economic crisis in Africa, the Environment Section provided inputs on the submission regarding the impacts of drought and desertification on the economic and social crisis and also contributed in servicing an OAU/UNSO/ECA ad hocmeeting of inter-governmental organizations and specialized agencies concerned with combating desertification in Africa. This meeting was held at ECA headquarters in March 1986.

A staff of the Environment Section represented the Executive Secretary of ECA at the Harare public hearings on the environment organized by the World Commission on Environment and Development from 15 to 23 September, 1986. At this hearings a statement was presented to outline the major environmental issues in Africa today as the ECA sees them and how they could be tackled.

In order to draw the attention in programme activities to the health and disease problem and their implications in the efforts to combat theimpacts of drought among the nomadic and displaced populations of the drought - and desertification-prone areas of the region, ECA with the collaboration of WHO have been preparing for an ad hoc expert group meeting at ECA in March, 1987. The meeting will discuss possible areas of joint programming or collaboration between concerned organizations at national, subregional and regional levels. Orientation for 1988 - 1989 activities will also be initiated and will be used as a guiding framework for programme activities and will be at the next meeting of the Joint Committee.

II. SITUATION AT THE LEVEL OF THE MULPOCS

This section contains summaries on activities in a selected countries in the MULPOC subregion. Only countries from which the secretariat has had updates for the period under review have been included. The other countries are requested to provide this information at this meeting.

1. The Lusaka-based MULPOC subregion:

A. Angola:

Despite resource constraints, the Angolan Association for the Engironment held its first meeting in 1982 in Luanda in order to plan for the establishment of the infrastructure necessary for a programme to combat desertification

in the country. The meeting also recommended the mobilization of the masses to execute national projects such as the afforestation of suitable sites near towns, organizing an annual tree-planting day in each province and the creation of information diffusion centers for extension work on desertification control. Angola needs a lot of technical assistance from international organizations and donors because of its late independence which had suppressed development and manpower training. Urgent aid is required by the Association a forest inventory survey project and for another on the conservation of the remaining forests.

B. Botswana

The problem of desertification in Botswana is centered around over-grazing and over-stocking of livestock around water holes. A large number of projects are being undertaken by the government that are aimed at the development of agriculture irrigation and water resources, the introduction of alternative sources of energy and the development of the institutional framework for the adaptation of technology and its dissemination[1/]. The following are some of the activities being undertaken by the Government to implement combating desertification programmes:

(a) Under the Tribal Grazing Land Policy, (TGLP) and Associated Livestock Development Programmes (ALDP) which have been integrated in the current National Development Plan, sound land use management practices which are also socially equitable and cost effective, have been introduced,

(b) Small dams for watering herds up to 490 have been constructed for communal use,

(c) An irrigation section has been established in the Ministry of Agriculture, and research into dryland farming and fixation of sand dunes is being carried out,

(d) Rural health centers and meteorological stations to monitor climate, vegetation changes and rangeland conditions are being expanded;

(e) A Drought Inter-Ministerial Group to develop facilities to cope with drought; an operational renewable Energy Technology Centre; a Natural Resources Technical Committee to monitor natural resources utilization: and a training course in Environmental Sciences at the University College of Botswana has been set up.

1/ See Michael B.K. Darkoh (1986): Combating Desertification in the Southern Africa region. Athen, Ohio, USA. February, 1986. This is the report of a consultancy that was carried out for UNEP.

C. Ethiopia:

The problem of desertification and land degradation in Ethiopia is typical of what has been happening in other countries Sudano-Sahelian Region. Though climatic conditions have had their play, the destructive activities of man in the form of agriculture and grazing had the most significant impact in Ethiopia. Over-grazing, deforestation, shifting cultivation and road construction practices especially in the high lands are the main causes of desertification, and is still taking measures to combat desertification and land degradation in many parts of the country.

To date, there are a number of on-going projects already being supported by international, bilateral and other agencies that are related to desertification control and protection of the Ethiopian environments. The activities within the Relief and Rehabilitation Commission (RRC) involves land-use planning, catchment reclamation and settlement. These projects are integral parts of activities to combat desertification, and are related to settlement and catchment activities. Some of these projects are awaiting external finance for implementation and others require detailed study and feasibility work.

D. Lesotho

To alleviate the effects of drought on the population, there is a Disaster Relief Committee comprising of representatives from the Ministries of Interior and Health as well as from the police, the Red Cross and the Cabinet Office. The committee is currently studying a proposal on "Policy Recommendations on Drought and Famine in Lesotho". These recommendations call for the setting up of a national co-ordination mechanism as a strategy for famine preparedness the setting up of a warning system and a contigency plan for funds, personnel training, logistics, food security, stocks, procedures and institutional responsibilities. Presently the Disaster Relief Committee is responsible for the distribution of food items to drought stricken areas or areas cut off by snow during winter. The Committee works hand in hand with the Food and Nutrition Co-ordinating Office, the Food Management Unit, and the UN World Food Programme. The Food and Nutrition Co-ordinating Office, located in the Prime Minister's Office, has responsibility for developing national integrated food and nutrition programme. The Food Management Unit (FMU) is responsible for procurement, storage and distribution of food donations in the country. In many cases, the estimated short-fall in food supply is more than the World Food Programme (WFP) can supply. Apart from the short-fall one major problem in drought relief is accessibility in the highlands.

E. Mozambique:

Government has set up a Department for Prevention and Relief of Natural Calamities under the National Planning Commission. This department is responsible for relief and rehabilitation of victims of drought, floods and other climatic disasters. The World Food Programme (WFP) and the FAO provide assistance both materially and technically. FAO is currently assisting in setting up a relief plan in which provision is made for strengthening the district administration to give it capacity to handle food distribution. In addition FAO is assisting the government in setting up 'An Early Warning System' under a project which will include training in processing meteorological date, remote sensing, and in strengthening the meteorological services network in the country.

World Food Programme (WFP) assistance in drought relief is linked with the afforestation programme. Currently, a US$19.3 million 5 year programme is being implemented, through which 'Food for Work' schemes are run for afforestation schemes in Maputo, Lofale and Inhambane - provinces. Currently some 4500 workers are employed in this scheme. In addition proceeds from sale of WFP food is invested in social infrastructure which will benefit the workers.

A Food Reserve Contingency plan to cope with drought and flood disasters has been established with the assistance of the World Food Programme. A strategic food reserve estimated at some 60,000 tons is to be established. It is estimated that this is the requirement of food for a period of 6 weeks - a time lead necessary for the shipment of food from Australia if necessary. The strategic food reserve is to be located at Maputo 35,000 tons, Beira, 15,000 tons, and Nampula 10,000 tons. In 1982, the World Food Programme is contributing some 10,000 tons of maize, the Government of Australia 10,000 tons of wheat, with the balance to be supplied by other donors.

F. Tanzania

A national plan of action on desertification control does not exist as such, but the various ministries concerned with natural resources development encourage inter-sectoral activities to combat the impact of drought control desertification. In this regard, the proposed Multi-disciplinary Interminis terial Committees on Land Use Planning should play a crucial role in enabling formulation of an integrated national land use plan which has been built into its components on desertification control. Government is presently studying the 'Draft Plan of Action to Combat Desertification for Tanzania', prepared by a UNEP mission in September/November 1980. This expected to help government's thinking on incorporating desertification control planning in the framework of the proposed interministerial committee.

Agencies like the Rufiji Basin Development Authority and the Regional Physical Planning Section of the Ministry of Lands, Housing and Urban Planning are very anxious about integrated regional planning in which definite provisions for desertification control would be included. The first such regional plan of the 'Uhuru Corridor', an area staddling the Tanzania - Zambia Railway - seems to have provided very useful experience on the importance of an integrated land use plan in which questions of environmental protection, conservation, catchment management, land capability, etc. are in corporated in the plan.

G. Zimbabwe:

In each province, there is Drought Relief Committee, which comes under the Ministry of Labour and Social Welfare. Its membership is drawn from the main Ministries, and each committee is provided with funds to extend relief in form of food and water to areas affected by drought. A UNESCO-MAB IPAL project identified the following constraints as necessary to be taken into account in any future management plans for desertification control:

(a) Failure to protect land in the vicinity of water of supplies against over-exploitation leads to serious environmental degradation around water holes;

(b) The lack of adequate livestock marketing facilities and the difficulty of relieving the high concentration of livestock in the vicinity of settlements as well as the urgent need to restore a measure of livestock mobility which had been lost in recent years with the continuous reduction in nomadism;

(c) The lack of security against banditry and the means to insure pastoralists against the loss of their livestock through drought, diseases and cattle raiding;

(d) The difficulty of finding suitable substitute material for local trees which were normally felled in large numbers in order to build livestock enclosures in Sahel vegetation;

(e) The questionable acceptability among pastoralist people of recommended management practices for arid lands; and the capability of Governments to provide the authority form implementing them;

(f) The very great difficulty of providing flexibility in management procedures including alternative forms of livelihood to animal husbandry, which would accomodate to the extreme variability of annual rainfall and the consequent variability in plant production and short-term livestock carrying capacities in arid and semi-arid lands.

Activities by subregional organizations in the Lusaka-based MULPOC

a) Inter-Governmental Authority for Drought and Development (IGADD):

The Inter-Governmental Authority for Drought and Development was established in December, 1985 with the objective of Coordinating activities for combating the impacts of drought and control desertification in the countries of Eastern Africa, namely, Djibouti, Ethiopia, Kenya, Sudan and Uganda. IGADD has developed a strategy to combat the impacts of drought and desertification that is embodied in a Plan of Action. The objectives of the Plan of Action are, inter alia,

a) "to co-ordinate and supplement the efforts of member states to combat the effects of drought and other related natural disasters and to assist their development efforts as well as help them to deal with the problem of medium and long-term recovery and rehabilitation: .....

b) to assist member states in setting up deadlines and action programmes for drought and desertification as well as following up the implementation of drought related activities of the sub-region: ..."2/

b) Southern African Development Co-ordination Conference (SADCC):

The Southern African Development Co-ordination Conference (SADCC) comprises of Botswana, Lesotho, the United Republic of Tanzania, Zambia and Zimbabwe. The Conference entrusted the Kingdom of Lesotho with the task of co-ordinating activities relating to Soil and Water Conservation and Land Utilization. The objectives of the Soil and Water Conservation and Land Utilization Co-ordination Unit are:

a) to improve member government performance in relation to soil and water conservation and wise land use:

b) to avoid conflicts of interest that may arise out of environmental degradation:

c) to develop policies and practices based upon involving the people in conservation activities: and

d) to integrate relevant disciplines and the contributions of the various concerned institutions in solving problems of conservation and land utilization.

2/ See Inter-Governmental Authority for Drought and Development, Assembly of Heads of State and Government, First session, Djibouti, 15-16 January, 1986: Basic document, Vol. 1.

To achieve these objectives many learning projects and programmes have been intiated. These include:

a) Integrated Planning and Conservation Strategies:

b) Methodology for Cost-Benefit Analysis in conservation activities

c) Monitoring systems for environmental control:

d) Training facilities in the SADCC region:

e) Involving the people in programme implementation:

f) Management of projects and programmes:

g) River basin management:

h) Applied research and laboratory facilities:

i) Conservation policy making:

j) Erosion mapping of the SADCC region

k) Monitoring systems for environmental control:

l) History of soil conservation, conservation policies and people's involvement:

m) traditional skills and existing conservation practices:

n) Land degradation and desertification control.

2. Activities in the Yaounde-based MULPOC subregion:

Chad:

Since 1969 which marks the beginning of very severe droughts in Chad, the Government has established a number of projects such important among which are: (a) The creation of a green-belt around N'Djamena, and other

(b) the Operation Green Sahel which is aimed at reinforcing re-afforestation activities all over the country.

3. Activities in the Niamey-based MULPOC subregion:

A. Benin:

Recently, a Commission for the Preservation of the Environmentation of the Environment was formed by intellectuals to promote forestry legislation and policing of reserves and the prevention of illegal tree cutting and hunting. Voluntary groups also run a programme to promote activities to control desertification by creating environmental awareness and discouraging deforestation practices.

B. Guinea:

Two administrative committees ensure the co-ordination of most activities directly or indirectly concerned with the desertification campaign. They are:

(i) The Permanent National Committee on Manandthe Biosphere (MAB):

(ii) The National Technical Committee for Co-ordinating regional project UNSO/RAF/81/060 for the integrated development of Fouta-Djallon.

These projects are intended for the study of the customary methods of exploiting the environment, in order to analyse:

- Slash and burn agriculture:
- The frequency of changing to new pastrue:
- The amount of firewood collected:
- Overgrazing within the livestock environment:
- The needs for basic food products, which are constantly rising because of the demographic explosion.
- The non-use of fertilizers within agriculture.

C. Nigeria:

A total of 57 tree nurseries had been established within the arid zone by the National Committee on Arid Zone afforestation about an equal number of nurseries had also been established by the States Forestry Division in the country over 16 million seedlings are being produced each year, although the current economic depression reduced the seedling production in 1982. Each nursery was supposed to raise 250,000 seedlings. These targets were achieved in most of the nurseries but there are a few cases where inadequacy of water supply constituted major constraint.

About twenty-four boreholes had been provided in the five states namely Bauchi, Bornu, Kaduna, Kano and Sokoto, that are drought and desertification-prone. In some of the nursery sites where water is a big constraint in raising seedlings. Other major free inputs given to the States Forestry Division include polypots, cattle fencing and barbed wires and treated fencing posts.

Two large fruit tree nurseries were also established in each of the five states in order to encourage local people to establish orchards. Each of the fruit tree nursery is capable of raising up to 11 million seedlings. The fruit tree nurseries are sited at Bauchi Azare (Bauchi State) Maiduguri, Gashua (Borno State) Katsina, Daura (Kaduna State Ringim, Thomas Dam (Kano State. Gwalli and Kassagarunwa (Sokoto State).

Even though the Committee is not directly involved in forest plantation establishment: it functions at present in mobilizing individuals and communities in the Arid Zone and arousing their interests in planting trees. Communal and private establishment of plantations are highly encouraged by providing seedlings, and fencing materials as free inputs to anyone who shows genuine interest in woodlot establishment. Over 3,000 hectares of plantation had been established so far.

Efforts are also being made by the State Forestry Division by getting both the Radio and Television Stations as well as traditional rulers involved in the annual tree planting campaign. It is pertinent to mention that since the inception of the Committee, tree planting campaigns were held in may Local Government Areas in the Arid Zone than in the previous years.

In order to get grassroot participation in the project, the Local Government Forestry personnel have got to be fully utilized. Unfortunately, in most of the states such staff where they exist lack the professional competence to cope with the job. It has therefore been proposed that refresher courses and in-service training be organized to enable the Local Government staff acquire the basic knowledge of forestry matters relating to Local Government and rural development. Courses would be organized also for state forestry officials - Forest Guards, Local Government supervisors, Sivicultural Assistant and Forest Assistants and Superintendents.

One school had been established in Kano near Bayero University Campus. It is situated on a 25 hectare piece of land at Dorayi Forest Reserve. Blocks of classrooms, hostel, staff quarters and administrative blocks had been provided. The School would take off any mement from now as soon as electricity and water supply are affected.

D. Senegal:

At the present time the Environment Department of the Ministry of Plan is specifically charged with the co-ordination or control of the programme to fight desertification. At the forefront of this struggle, however, is rural development. This development integrates all aspects of concern over natural resources. The fight against desertification and its effects necessitates an integrated overall approach, which is made difficult by administrative compartmentalism. For this reason, in 1973, the government of Senegal first regrouped the key sectors concerned with desertification into a unique ministerial department and then elevated into a Ministry this sector whose autonomy is essential in the struggle against desertification. The main government departments in these efforts are:

- The State secretariat for Water and Forest - The services of the Ministry of Rural Development, notably the Direction General de la Planification (D.G.P).

- The services of the Ministry of Urbanism of the Habitat and of the Environment.

- The Ministry of Water Affairs.

- The department for the study and application of solar energy.

- The Senegalese Institute of Agronomical Research.

- The National Committee of CILSS.

- The Senegalese Institute of Environmental Sciences.

Senegal also has a number of services which can help in activities to combat the impacts of drought and desertification within and outside the sphere of rural development. However, more co-ordination is needed to create a coherent group which functions in the following **May**.

Activities by subregional organizations in the Niamey-based MULPOC.

a) Comite Inter-etats pour la Lutte contre la Secheresse dans le Sahel (CILSS):

The main objectives of CILSS has been to promote the overall development of capabilities for desertification control in its member states through programmes for food and animal production, reafforestation, drought relief and the development of an infrastructure of activities to reduce the vulnerability of the economy to the vagaries of climate. In order to finance the

implementation of these programmes CILSS has developed an association the Organization for Economic Co-operation and Development (OECD) donor countries which operates through the Club du Sahel since 1976. CILSS works very closely with United Nations Sudano-Sahelian Office (UNSO), UNEP, UNESCO, FAO and other organizations concerned with combating desertification in the Sahel of West Africa.

III. CO-ORDINATION OF REGIONAL ACTIVITIES:

a) Organization of African Unity (OAU):

In response to General Assembly resolution 34/185, an OAU project on the restoration and improvement of the Fouta Djallon Massif, approved by OAU Council of Ministers resolution 756 (XXXIII), was considered by the UNEP Governing Council at its eighth session and incorporation into the environment programme by its decision 8/17 of 29 April 1980. UNSO assumed responsibility for implementing the OAU project and organized an inter-agency mission in May/June 1980 to the Fouta Djallon Massif with FAO, UNESCO, OAU, UNSO and with the support of the Government of Guinea. Follow-up on this pilot project awaits the report of the mission. During 1985 and 1986 UNEP and ECA had consultations on the final implementation of the project.

b) Food and Agriculture Organization (FAO):

Several FAO programmes and field activities deal with the agricultural and forestry development problems of arid and semiarid land areas. FAO believes that the design and execution of projects in this field must be accomplished with maximum participation from the habitats of the area affected. Training at all levels and the building of strong institutional capability are also essential to the long term success of desertification activities. A prime requisite for success is an understanding of the ecological system and prevailing social factors in which the activity is to be carried out. Too often these factors are not given sufficient consideration.

c) United Nations Environment Programme (UNEP)

UNEP, in compliance with the call of the Plan of Action, has undertaken the organization and co-ordination of a number of projects at international and regional levels. Among them several have been either of direct or indirect interest to the African countries. In 1985 UNEP approved the development of a project to reinforce the co-ordination of action to combat desertification by African NGOs. The project aims at formulating and assisting in the implementation of field projects, compiling a directory of NGOs working in the field of desertification control technology, producing a set of recommendations on how NGOs can assist more effectively to implement the plan of Action, and publish a newsletter that will act as a focal point for information exchange between NGOs and other bodies and between NGOs themselves.

UNEP also upgraded its Desertification Control Unit into a Programme Activity Centre (PAC). The Desertification Control PAC in 1986 embarked on a new long term programme to concentrate their limited resources on a few selected countries for a three to five year period. Most of the countries concerned are in Africa. The concentration strategy will involve a phased approach in each country with the ultimate goal of formulating a National Plan of Action to Combat Desertification as an integral part of the overall development plan, in conformity with resolution 22 of the PACD. In collaboration with ECA and OAU, UNEP also organized the first African Ministerial Conference on the Environment held in Cairo, December, 1985 which laid down a programme of work for conserving the African environment.

Information dissemination activities are increasingly becoming important at UNEP as the organization has realized that little can be done if decision makers, governments and the public are not aware of the very real threat that desertification posses to their future and the options open to them for halting the spread of the desert and degraded lands. To enhance the quality and effectiveness of its activities in this area, the Desertification Control PAC is establishing a computerized Desertification Information System at UNEP headquarters beginning in 1986. Data files are being created on institutions and organizations concerned with desertification, the activities of the UN system, NGOs, individual countries and UNEP in this field, an annotated bibliography of publications and reports of various desertification topics, a compendium of desertification control technologies, a listing of sources of expertise and funding, and other related subjects. It is estimated that the system will become functional in 1988.

The Desertification Control PAC is also setting up a Desertification Database which will contain data on the status, rate and risks of desertification at the national level. The data will be gathered and compiled using a variety of methods, including projects using the FAO/UNEP formulated methodology for assessing and mapping desertification. The data collected through these projects will form part of a national Geographic Information System. The Desertification Database will be used by UNEP to disseminate information on the nature and spread of desertification in different parts of the world. The national databases will be used by governments in formulating plans to combat desertification and in monitoring their effectiveness.

d) United Nations Sudano-Sahelian Office (UNSO):

The principal thrusts of UNSO's desertification control operations have been in combating deforestation, range management, water resources management, sand dune fixation, planning and programmeing. These activities focus on the main causes and manifestations of desertification in the region and respond to the priorities set by the Governments and their specific requests for UNSO assistance. UNSO is increasingly adopting a multidisciplinary approach, with these considerations in mind.

In the same vein, afforestation programmes to provide the countries with fuel and construction wood on an ecologically sound basis, are now increasingly linked with and paralleled by projects involving improved, fuel-efficient stoves. Projects for the development and building of such stoves, using local materials and labour for the most part, have been initiated.

e) World Meteorological Organization (WMO):

One of the most important contributions of WMO in combating the impacts of drought has been the establishment of the Agrometeorological and Hydrological programme (AGRHET). The area covered by the programme is between latitudes 23 1/2 N and 10 N, extending from the west coast to central Africa, covering 5 million sq. km. of territory including environments ranging from deserts to humid forests. The CLISS member countries are Chade, Gambis, Mali, Mauritania, Niger, Republic of Cape Verde, Senegal and Bourkina Faso. A large part of the area is semi-arid grazing land of variable quality and less than one tenth is arable. The staple food crops are millet, sorghum and cowpea. These are cultivated on about two-thirds of the land groundnuts and cotton are also grown. There is some irrigation, mostly in river basins, thus providing slightly higher and less variable crop yields and permitting some double cropping.

The main objective of the AGRHYMET Programme is to supply the rural community in the area with meteorological data that can be used to increase food and livestock production. Agroclimatology in the Sahel is aimed at the optimum use of rain and surface water resources. The identification of the data and their presentation for use in agriculture is an essential task for operational agroclimatology, and an essential link between basic meteorology and climatology on the one hand and application of these sciences to agriculture on the other. The programme involves the creation of a system for the collection and application of the basic meteorological and hydrological data to agriculture and water resources management and the training of personnel to observe, analyze and apply the derived data. The national components of the programme involve the expansion of meteorological and hydrological networks, collection and processing of the data and dissemination of informations to the users, in particular agronomists and hydrological engineers. Training of agrometeorological and hydrological personnel is one of the prime functions at the AGRHYMET Centre created under the Programme in Niamey. Progress has also been made in the reinforcement of the network of observing stations. Table II gives the network of stations at end of 1981 and proposed stations to be established during the next phase (1982-1986)

IV. PLANNED ACTIVITIES FOR THE NEXT REPORTING PERIOD:

A. ECA Programme of Work:

The Environment Section is giving the main thrust of its activities for the 1988 - 1989 reporting period with combating drought and desertification as the most important priority. It will therefore continue activities to develop capabilities for combating the impacts of drought and for controlling the desertification process. In this connexion, the following activities are being proposed:-

a) Data will be collected and a report will be prepared on the measures to mitigate environmental degradation, health and disease problems related to drought and desertification in the Niamey-based and Lusaka-based MULPOCs. These reports will be presented to the policy bodies of two MULPOCs in 1988 and 1989 respectively. The idea here is to draw the attention of policy-makers, decision-makers and planners of the countries affected of the need to have systematic programmes that will, in an integrated manner, cater for environmental protection and the control of transmissible diseases among these populations that are highly nomadic and in some cases, displaced.

b) As a contribution to the implementation of the African Ministerial programme of the Conference on the Environment, ECA proposes particularly the development of capabilities for combating the impacts of drought and the desertification control aspects of it, ECA proposes to assist member states to incorporate the programme activities into on-going national environment programmes. Advice is therefore need from participants on how best to do this. A report of this will be made to the joint committee at its meeting in 1989.

c) Within the context of the United Nations Programme of Action for African Economic Recovery and Development 1986 - 1990, ECA proposes to monitor the implementation of the drought and desertification aspects of the programme and report to the Joint Committee at its next meeting in 1989.

d) ECA also proposes to organize a study tour, if the funding is acquired, for representatives of member states to four countries of the North African MULPOC to see how they have been implementing measures for combating drought and desertification. The idea here is to initiate intra-African technical co-operation on drought and desertification activities.

V. CONCLUSION:

The preceding paragraphs are only an over-view of the many activities on the development of capabilities for combating the impacts of drought and for the control of the desertification process in the region. It will be very useful for participants to update the information contained therein as concerns their countries or organizations to assist the Commission in the assessment of the progress being made so that related programme activities can be developed accordingly. It is also extremely important that participants provide their comments on the proposed activities so as to facilitate their implementation in member states.

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DEVELOPMENT OF ENVIRONMENTAL TRAINING FOR TECHNICIANS ON MARINE POLLUTION, COASTAL EROSION AND DEPLETION OF MARINE RESOURCES

I. Introduction

1. The protection and preservation of the African coastal and marine environment is an obligation of member States of the Economic Commission for Africa. At present three programmes exist within the United Nations system to assist African countries to carry out their obligations for monitoring marine pollution and resources depletion in the African coastal and marine environment. These programmes are:

(i) The UNEP Regional Seas Programmes which are implemented on a subregional basis with inter-agency support programmes including that of ECA, for collaborating member States to agree on related conventions and protocols to protect their marine environment;

(ii) The ECA/UNESCO joint project on Development of Marine Science and Technology in Africa, and

(iii) Various ECA projects relating to the convention on the Law of the Sea, part XII - Protection and Preservation of marine environment.

2. Four of the ten UNEP Regional Seas Programmes concern the protection and preservation of the African coast and marine environment, namely the Mediterrannean, the Red Sea and Gulf, the West and Central African and the East African regional seas programmes. Each regional seas programme has an Action Plan to deal with problems such as monitoring marine pollution, control of coastal erosion and development, and conservation of living marine resource. The Action Plans are approved by the governments in the subregion who also adopt a convention and protocols and agree on financial arrangements to implement the programme.

3. Besides, the three priority areas identified above as common to the regional seas Action Plans, other immediate areas usually dealt with are:

(i) Institutional arrangements for co-ordination of national contingency plans for marine pollution emergencies,

(ii) supporting measures such as manpower training, information exchange and legislation for marine affairs;

(iii) technical studies on specific topics such as oil pollution, river inputs industrial sources, marine pollution, and

(iv) environmental impact assessment and management of coastal development projects.

4. The Economic Commission for Africa is interested in the area of manpower training on marine technicians as one of the areas identified above. This implies developing national technical capabilities of African countries for a systematic monitoring of pollution in the coastal marine environment as well as developing the manpower resources.

both professional and technical, necessary to implement the programme. To develop a reliable management programme for the African marine and adjacent coastal environment, the assessment component must be based on comparable methodology for scientific data collection during monitoring, analysis and for the synthesis of the reports by each coastal African country. This demands regional co-operation for an intensive training programme to close the gap between what needs to be done and the availability of technical trained manpower.

5. To prepare training guidelines for technicians to be trained to carry out monitoring activities for marine pollution and resources depletion in the African coastal marine environment, ECA hired a consultant in 1983 with the following terms of reference to develop the guidelines:

(i) Investigate the availability of technician training institutions and trained technicians in marine sciences in African coastal states

(ii) To prepare guidelines and principles on which to base the training of middle-level technical manpower to carry out national programmes and projects for the protection and preservation of the marine environment and the socio-economic development of the coastal areas; and

(iii) To assess the training needs of African coastal States to implement the provisions of the Convention on the Law of the Sea with particular reference to UNEP Regional Seas Programme working coments. UNESCO's Report No. 5 on syllabus for training marine technicians (1979).

The purpose of this document, therefore, is to report on the findings of the study and propose follow-up activities.

II. Highlights of the study

6. Three major environmental problems of the coastal areas of the African region were identified. These are:

(a) Pollution

(b) Coastal Erosion and Siltation

(c) Resource Depletion

The extent of each of these problems in any of the African coastal states depends on a number of factors such as geographical and geomorphological influences type and amount of potential living marine resources and the level of industrial development.

(a) Water and marine pollution

7. In addition to aesthetic impairment, the various transfer routes of water pollutants into the marine environment can lead to the following types of pollution in general; namely: (i) aesthetic, (ii) physical (iii) chemical (iv) microbial and (v) thermal pollution.

8. Aesthetic aspects of marine pollution comprise, for example of odour nuisance from anoxic coastal waters especially near mangrove swamps, and the littering of beaches, bays and estuaries with bottles, plastics, food containers, metal cans, old tyres, etc, thereby imparing or obstructing the use of sea water and causing a reduction in amenities.

9. Physical pollution pertains to silt and sediment load carried into estuaries and the coastal environment by rivers, rendering sea-water turbid, creating ecological stress on fauna and flora (especially on coral reefs) and causing hindrance to coastal shipping activities.

10. Chemical pollution is a direct consequence of the introduction by various pathways of toxic inorganic chemicals such as the heavy metals (mercury cadmium, chromium and lead) and persistent toxic chemicals such as chlorinated pesticides herbicides, insecticides and polychlorinated biphenyls (PCBs) which could be accumulatively toxic to marine organisms when present at high concentrations, or cause devvstating physiological disorder and behavioural responses when present at sub-lethel concentrations. Wildlife and man suffer harmful health effects which sometimes manifest themselves through reproductive failures due to the ingestion of marine biota polluted with toxic chemicals, including petroleum hydrocarbons.

11. Microbial pollution is caused by sewage pollution of coastal waters and associated biota, resulting in contamination of coastal waters, fish and shellfish with epidemic-causing pathogenic organisms such as Salmonella typhi and vibro cholerae. Serious health risks are posed to man through body contact with such polluted water in bathing or swimming and by ingestion of raw or half-cooked contaminated seafoods caught in such waters.

12. Thermal pollution results from the discharge of thermal power station cooling water effluents or hot effluents from industrial complexes usually with high temperatures of 40° - 60°C into estuaries or lagoon waters. Fishes in tropical waters are known to live just below their upper lethel temperatures limit (30°C) for their survival, so that any addition of heat energy into the marine environment is detrimental to their survival. Heat could result in fish kills or in altering natural behaviour of stressed biota. Although fish kills have been recorded generally near the source of the hot effluents, they are often due to the biocides used in the cooling systems. "thermal pollution" does not appear to be a significant marine problem, particularly since there is increased growth in warmer water which may well compensate.

Sources of marine pollutants

13. In almost all the coastal sub-regions of Africa, the primary sources of pollution are:

(i) Sewage discharge

(ii) Domestic/commercial waste discharge

(iii) Industrial waste outfalls

(iv) Agricultural wastes disposal

(v) River run-off and land-based marine pollution

(vi) Mining activities (metals and non-metals)

(vii) Marine based and oil pollution

(viii) Radioactive discharges from nuclear installations

Sewage discharge

14. The materials of concern in sewage are phosphates nitrates (and ammonia) heavy metals and unfortunately sometimes pathogenic bacteria and viruses. Certainly nitrates and phosphates (along with silicates) are the vital nutrients of the sea that ultimately produce the seafood that man so dearly relishes. Along beaches, sewage is a major problem both for aesthenic reasons and because of the increasing possibility of disease.

Domestic/commercial waste discharge

15. Undoubtedly, domestic sewage is the most common source of pollution in African coastal waters. It is discharged, untreated from almost all the coastal towns in the region and causes pollution in many cases. There are relatively few sewage treatment plants in the region, and in some cases where they exist they are often overloaded and in bad working order. The presence of faecal coliform (Eschetichia coli) and faecal streptococci (Streptococcus faecaelis) in water and the sediment, is a hazard to health as these organisms get ingested into the body of filter feeder organisms, bottom dwelling fish, prawns and bivalves, which make them unfit for human consumption. Such pollutants arise from human and non human faecal matter and they constitute an "indicator bacteria" group.

Industrial waste outfalls

16. Pollution problem created by sewage, is a common environmental problem that affects most countries in the Africa region, whilst industrial effluent problems problems are restricted to a few countries. Industrial wastes from a variety of sources (breweries, cement factories, slaughter houses tanneries, fertilizer factories, cotton and textile factories, sawdust from the furniture factories etc) are discharged into the sea either through rivers or directly. In some countries with oil refineries, oil pollution of the coastal waters by oily water discharges is inevitable, and where the discharges go into lagoons, the problem is particularly serious.

Agro-chemical pollution

17. Pollution from agricultural activities is inevitable in a region where agriculture is of paramount importance and its development is vigorously pursued towards the goal of food self-sufficiency and export crop earnings. Many of the countries

concerned use appreciable quantities of insecticides, pesticides and fertilizers such as DDT, aldrin and NPK respectively. They constitute an important source of pollution from factories where they are produced and from drainage and run-off from farm land via the rivers to the sea. Some of them are fairly stable and non-biodegradable, hence they persist in the water as pollutants. For example, chlorinated hydrocarbons find their way thorugh various pathways (largely through the atmosphere) to the ocean. Their threat to the marine biota lies in their toxicity (indeed that is the purpose of pesticides) and their persistence. Once broken down into their components (chlorine, hydrogen, carbon, oxygen) they would be completely innocuous in sea water. Unfortunately, the degradation process is extremely slow, and some scientists fear these substances may even poison the organisms responsible for their degradation in the ocean. If true this would be a very serious problem.

River run-off and land-based pollution

18. Several countries are actively exploiting their forest resources for timber and timber products for exports. In many cases, the river system is used to transport the logs to coastal ports for further processing or for direct export. In some instances, logs break free from the rafts and are to be found later, either floating at sea or stranded on the coastal beaches. In other cases where the logs are used in the manufacture of veneers and plywood the wastes are discharged into the coastal waters as is generally the case for other industrial effluents.

19. Another problem which can be created as a result of timber exploitation or simply the clearing of forest areas for agricultural purposes is soil erosion. The soil is washed into the rivers and carried to the coast where it settles in the calmer waters. The result can range from interference with navigation, direct effect on fisheries through increased turbidity and silting at the bottom. These are liable to be particularly acute in mangrove swamp areas such as those found along several parts of the coast of many African countries. Siltation of harbours and shipping canals are already recognised as a serious problem, since it has been greatly enhanced by deforestation over the past decades in several coastal African countries.

Mining activities

20. Mineral exploitation is of major importance in several African countries and as the waters used for washing are usually discharged without prior settlement the fine materials eventually at the bottom in the adjacent coastal waters causing an accumulation of silt and permanent, increased water turbidity. In most cases the fine materials contain considerable amount of mineral wastes (mercury iron, copper, etc.) which enter the sea from mining activities in these countries endangering marine life and human health through poisoning and other toxic effects.

Marine-based and oil pollution

21. With increasing numbers and sizes of tankers travelling through the Atlantic Ocean, the Indian Ocean and the Mediterranean Sea, oil spills and oil contamination of the beaches have caused near serious pollution problems at tourist sites along many African coasts. Oil pollution risks also include collisions or groundings of oil-laden tankers and operational discharge from tankers in ballast condition; some contamination of oil from the washing of oil tankers has also been observed on African coastal beaches.

22. The main sources of oil pollution, especially along the West African Coast and the Mediterranean include:

(i) Bullasting/deballasting operation of tankers,
(ii) Discharge of oily bilge-wate[illegible] tankers,
(iii) Tanker washings,
(iv) Refinery effluents,
(v) Discarded lubricants and other oils from ships
(vi) Accidents to tankers and other vessels,
(vii) Off-shore exploration and exploitation
(viii) Accidents to pipelines and terminals at ports,
(ix) Natural seepage of oil into the sea, and
(x) Atmospheric rain-out.

23. Specifically, marine-based pollution are due to the following activities namely:

(i) Maritime and oil tanker traffic causing oil pollution problems at the shipping routes,
(ii) Exploration and exploitation of sea-bed resources for oil and minerals at the EEZ,
(iii) Sand and coral mining for building materials from off-shore coral reefs,
(iv) Coastal construction and dredging in the construction of new ports jetties and ferry landings,
(v) Ocean dumping of radio-active wastes and other dangerous and toxic chemicals.

24. Since oil pollution is widespread along the Atlantic and Mediterranean coasts the immediate damage is on sea birds, and on mussels and oyster beds. Adult fish usually survive, but may have attained oily flavour that makes them unmarketable. Oil spills often affect marine organisms by coating the gills and hence limiting the wxygen exchange with the surface. Ingestion of volatile paraffin, olefin and aromatic hydrocarbons can cause functional alterations. Certain aromatic constituents of oil are also carcinogenic. In the economic sense, the greatest damage is probably to tourism in Africa which generally have coastal infrastructure.

Radioactive pollution

25. As nuclear research increases, so will the amounts of radionucleoids being released into the oceans increase. With their long residence times they will remain contaminants for many years. Nuclear research is not yet very evident in most of the countries of the African coast, but the effects of such activities in Southern Europe (France, Spain, Italy, etc.) are beginning to become evident in the Mediterranean subregion.

26. Radionuclides are not foreign materials in sea water. Natural radionuclides which emit all three types of radiation found in uncortainated seawater. Even after massive atmospheric nuclear weapon tests, which release for more radioactivity than the total nuclear power programme, only a small fraction of the radioactivity in the ocean derives from man. In marine organisms, moreover, it is clear that the major contributor to the radiation does is usually the naturally occuring alpha-emitter polonium-210. There has been increasing concern about polonium, but the present levels of this element in the marine environment again are very low compared with the levels of natural radionuclides.

(b) Coastal erosion and siltation

27. Erosion can be considered as a special case of negative pollution in which the living soil is lost from the earth's surface which becomes bare of plant and animal life. Siltation results from erosion of topsoil in inland areas. Soil erosion generally follows periods of heavy rainfall when the rivers often overflow and water runs overland carrying soil with it to the sea. The effects are greater during flash floods when rains follow a long dry spell during which the soil has already been loosened. Intensive grazing by livestock and a poor choice in crops can also lead to erosion. Erosion of the coastal areas by heavy wave action often leads to the destruction of tourist beaches by the removal of the sand leaving a rocky beach covered only with pebbles. Coastal reefs can act as a barrier against erosion of the beaches by waves.

28. The retreat of the coastline is a problem arising from erosion by waves in Ghana and Togo. Siltation may be a way of counteracting this! However, siltation results in an increased amount of nutrients entering the sea which leads to excessive algal growth, and damage to coral reefs as the turbid water reduces light intensity and the fine particles smother the corals growth with adverse effects on the coastal nursery frounds for fishes. Furthermore, the building of dams across naturally flowing large rivers decrease the rate of flow downstream and it reduces nutrient concentrations in estuaries and coastal waters which decreases the number of plankton blooms and fish landings.

(c) Resource depletion

29 The potential resources of the African region are diverse. Man has not failed to put most of them to economic and social uses for example: land for cultivation and settlements, extraction of timber from forests, utilization of fauna as food and

for recreation, use of beaches and lagoons for recreation extraction of terrestrial and marine life forms for decoration and so on. Concerning the depletion of living marine resources, the most important biotic factor is no doubt man himself. Through his ability to occupy and utilize a wide range of terrestrial ecosystems and species man has been able to change whole ecosystems with far-reaching, frequently deleterious effects on the organisms living there.

30. The impact of excessive deforestation of humid forests on depletion of marine resources can be seen in coastal West African countries where shifting cultivation and deforestation for timber export and for fuelwood energy supply expose the fragile tropical soils to water erosion during the long rainy season. Also, overstocking with livestock in savanna regions has led to severe erosion of the top soil. The soil is carried down to the coast and into the marine environment resulting in the silting up of lagoons and estuaries to form mangrove swamps, and the killing of coral reefs. The ultimate effect on the marine environment, is loss of fisheries productivity due to lack of growth of the algae and coral polyps, upon which fish and other organisms depend for food, which is dependent on clean and clear waters.

31. When not carefully studied and planned, large scale hydro-agricultural projects involving irrigation works and flood control projects have adverse impacts on ecosystems and biota downstream especially in deltas and nearshore marine ecosystems. It has been observed, for example that sardine productivity in the Mediterranean sea off Egypt has declined since the impounding of the river Nile by the Aswan Dam, and so has the fertility of the Nile Delta itself. The Cabora Bassa Dam (1975) on the Zambezi River, Mozambique, has reduced the river flow and disasterrous flooding regimes that used to be frequent downstream and at the delta; but a reduction in shrimp productivity occurred inevitably while salt water comes as far as 80 km upstream now.

32. The various types of pollution sources and effects discussed earlier account in part, for much of the depletion of the living marine resources of the region. It was also shown by the above examples how unplanned hydro-agricultural and other coastal development projects adversely affect the ecosystem and, ultimately lead to depletion of the associated living resources. Another source of depletion is related to over-exploitation of these resources, e.g. over-fishing in West Africa. Natural disasters and acts of war (including vandalism with the use of dynamite) also contribute in a significant way in some countries, to the depletion of marine resources.

III. Training needs for national development in marine sciences

33. The problems of pollution and living resources depletion in African coastal waters and marine environment have been shown to be significantly important in the context of socio-economic development. It is also abundantly clear that the coastal zone and the near-shore environment in the region have potential resources for exploitation such as, fish-stocks, possibilities of mariculture heavy minerals and evaporites and tourism, etc. But the marine resources of Africa still have a great potential for economic development.

34. For purposes of protecting and preserving the coastal and marine environment and in order to do these through monitoring pollution and depletion of resources it is necessary for the countries concerned to have trained and competent personnel who are fully equipped with the knowledge skills and expertise to carry out the required tasks. Indeed African countries as part of their development objectives are expected to rationally exploit available natural resources (including coastal and marine resources) to the optimum level, so as to provide maximum benefit to their peoples. To attain such an objective, it is essential to create and develop a technical manpower of well-trained scientists and technicians in the region.

35. It is well known that one of the greatest problems in the developing countries in general, and African in particular, is the acute shortage of middle-level manpower, especially in the fields of science and technology. The term 'technician describes the various types of personnel who come between the highly specialized professional or technological experts and the craftsman, who have the skill and knowledge necessary to apply and control technical practices that have been defined by technologiest'. Thus the term covers wide sectors of development including engineering health, agriculture, commerce and industry as well as education and science, not forgetting marine science and technology.

36. Surveys which have already been carried out in the area by an ECA/UNESCO project confirm that none of the African countries concerned has adequate expertise and facilities required to carry out the development of their marine science and technology. The greatest need in pollution monitoring and control is for technicians. The shortage of technicians is therefore a great obstacle to progress in any programme of monitoring pollution and control. What is required in the first place, are very strong educational training and research programmes in marine science and technology to strengthen and generate the indigenous scientific and technological manpower that could provide the marine administrators and decision-makers with the basic data and scientific principles necessary for the best management and development of their local marine environment.

37. Intensified subregional and regional training of scientific and technological personnel are decisive factors for Africa's economic and social development. The development of technical training must therefore be done in close agreement with economic development plans and in collaboration with the economic and social sectors concerned.

38. Environmental training of technicians for development will provide the knowledge skills and techniques needed to handle and solve environmental problems, including monitoring and control of pollution, to conserve and manage natural (including coastal and marine) resources and generally to protect and restore the quality of environment.

39. It has become clear from the study that, in programming training activities in marine pollution, coastal erosion and depletion of marine resources the following must be borne in minds that:

(i) the majority of national institutions in Africa are inadequately equipped and they lack the facilities to carry out the provisions of the Convention of the Law of the Sea. Such institutions dealing with marine science and technology are very inadequate and unevenly spread throughout the coastal countries of the region, consequently the number of technicians available for the defined tasks is abysmally small;

(ii) the state of national legislation for the protection of the African coastal and marine environment varies from one coastal state to another but in general there does not seem to be an adequaterly or fully developed system of legislation for this purpose in most of the countries concerned in fact it is doubtful whether practical enforcement of such laws takes place to any reasonable degree in those states having the basic legislative provisions for the protection of the marine environment.

(iii) training has to be directed on the technical aspect of the subject matter and towards effective policies for environmental legislation in the African countries, for developing environmental standards and for quality controls have to be established, coupled with scientific monitoring of pollutants in the environment;

(iv) environmental laws are required to regulate the level of pollutants permissible in the air, water and soil as well as the level of liquid and solid wastes in coastal and marine areas of the region. The law should make provision for setting up national standards laboratories for the monitoring of pollutants and contaminants in food, drugs and animal feed.

These pre-occupations do justify the need for the training of competent technicians to perform the complicated though routine analyses required. Effective pollution control demands the laws of legal draughtsman, the setting up of institutional mechanism for monitoring, a training component as well as a well spelt-out quality control policy for all development planning activities in the country.

IV. Suggestions for follow-up activities

40. (i) ECA hopes that this activity on the development of environmental training for technicians on marine pollution will sensitize member States to develop comprehensive programmes and strategies for training technicians in monitoring pollution and the depletion of living resources in the coastal and marine environment;

(ii) Guidelines on the Development of Environmental training for technicians on marine pollution, coastal erosion and depletion of marine resources in the Exclusive Economic Zone (EEZ) will be developed based on the study and with the cooperation of interested United Nations organizations (UNESCO, IMO, FAO, UNEP), to be published and made available for the use of member States and interested institutions,

(iii) ECA's report to the Third Joint Intergovernmental Regional Committee on Human Settlements and Environment 22-26 July 1985 (document E/ECA/HUS/ENV/3) regarding the report of ECA/UNEP training workshop for the incorporation of environmental components into the training programmes of ECA-sponsored institutions did indicate that programmes will be developed as the need arose. This is one of the areas of priority;

(iv) In order to finalize the above-mentioned guidelines, ECA is requesting all member States to up-date and complete the information being compiled in Annex I on Institutions for Marine Science and Technology in Africa, involved with monitoring of pollution, depletion of living marine resources and research on coastal erosion.

ANNEX I

INSTITUTIONAL RESOURCES FOR MONITORING POLLUTION AND DEPLETION OF LIVING RESOURCES IN THE COASTAL AND MARINE ENVIRONMENT IN AFRICA

	COUNTRY	NO. OF INSTITUTIONS	NAME OF INSTITUTIONS (BY CODE)	RELEVANT PROGRAMMES (Research/Training)
1.	ALGERIA	1	ALG (A)	Marine ecology and pollution studies: postgraduate training in oceanography.
2.	ANGOLA	2	ANG (A)	Research in biology and biological oceanography Training course in aquatic ecology.
3.	CAMEROONS		ANG (B)	Applied research in biology, physical oceanography, chemistry and geology.
3.	CAMEROONS		CAM (A)	Studies in marine sciences, oceanography and marine biology.
4.	CONGO		CONG (A)	Studies in physical chemical and biological oceanography towards fisheries development.
5.	DJIBOUTI		DJI (A)	Biological Oceanography
			DJI (B)	Studies in biological and chemical oceanography
6.	EGYPT		EGY (A)	Research and Training in physical, chemical and biological oceanography
			EGY (B)	Oceanographic studies oriented towards fisheries problems: Training courses for scientists and Technicians in hydrobiology, hydrography and fishery biology.

COUNTRY	NO. OF INSTITUTIONS	NAME OF INSTITUTIONS (BY CODE)	RELEVANT PROGRAMMES (Research/Training)
		EGY (C)	Research on all aspects of Environmental pollution Postgraduate Training in Public Health.
		EGY (D)	Studies in fisher biology limnology fish culture hydrobiology biochemistry and other activities dealing with inland water including Training courses for scientists and Technicians.
		EGY (E)	Environmental aquatic pollution.
		EGY (F)	Sanitary Engineering Research
		EGY (G)	Research and training in oceanography marine biology fisheries and acquaculture.
7. GABON	2	GAB (A)	Marine Sciences oceanography and marine biology
		GAB (B)	Marine Pollution studies.
8. GAMBIA	1	GAM (A)	Exploratory research on the river Gambia
9. GHANA	1	GHA (A)	Pure and Applied Research and Training in physical biological and chemical oceanography and fisheries oriented towards fisheries development.
10. GUINEA	2	GUIN (A)	Marine biology research
		GUIN (B)	Research in Oceanography and Heliophysique
11. Ivory Coast	3	IVO (A)	Oceanographic and hydrobiology research studies of the dynamics of the waters of the Gulf of Guinea.

COUNTRY	NO. OF INSTITUTIONS	NAME OF INSTITUTIONS (BY CODE)	RELEVANT PROGRAMMES (Research/Training)
		IVO (B)	Research and Training in oceanography, Aquaculture and Fisheries.
		IVO (C)	Studies on terrestrial ecology and hydrobiology.
12. KENYA	3	KEN (A)	Fisheries research with provision for physical, chemical and biological oceanography.
		KEN (B)	Research and Training in marine science.
		KEN (C)	Analysis of food, drugs and chemicals, water and sewage to assess quality for public health purposes trace metal analysis in marine produce.
13. LIBYA	2	LIB (A)	Baseline survey work of the Libyan mediterranean coast Training in Environmental studies.
		LIB (B)	Marine Fisheries Research.
14. MADAGASCAR	3	MAD (A)	Training and research in Oceanography.
		MAD (B)	Training and research in physical oceanography and hydrography.
		MAD (C)	Applied research in marine science and oceanography.
15. MAURITANIA	1	MAURITAN(A)	Research on oceanography.
16. MAURITIUS	2	MAURITI (A)	Biological Research
		MAURITI (B)	Study of the ecology of marine invertebrates.

COUNTRY	NO. OF INSTITUTIONS	NAME OF INSTITUTIONS (BY CODE)	RELEVANT PROGRAMMES (Research/Training)
17. MOROCCO	4	MOPOC (A)	Applied Fisheries research and training.
		MOROC (B)	Geological and Geochemical research of the continental shelf.
		MOROC (C)	Research on marine hydrobiology.
		MOROC (D)	Biological oceanography.
18. MOZAMBIQUE	3	MOZ (A)	Marine Biology and oceanography Research.
		MOZ (B)	Basic and Applied research in biology especially on fish molluscs and fisheries.
		MOZ (C)	Fishery biology: stock assessment acquaculture and chemical oceanography.
19. NIGERIA	4	NIG (A)	Applied research in biological, chemical and geological oceanography and fisheries.
		NIG (B)	Marine biology and ecology of the lagoons and estuaries, related to fisheries development and pollution monitoring and control
		NIG (C)	Applied research multidisciplinary systems of aquaculture of selected species of finfish and shellfish.
		NIG (D)	Basic and applied research in biological, chemical physical and geological oceanography. Research in fresh and brackish water quality surveys and inland fisheries
20. SENEGAL	6	SEN (A)	Research on the biology of fish and physical oceanography.

COUNTRY	NO. OF INSTITUTIONS	NAME OF INSTITUTIONS (BY CODE)	RELEVANT PROGRAMMES (Research/Training)
		SEN (B)	Research in marine biology and conservation of marine resources.
		SEN (C)	Fisheries research.
		SEN (D)	Training and Applied research in Fisheries and oceanography.
		SEN (E)	Analysis of fish quality and other marine resources for mercury and other pollutants.
		SEN (F)	Fisheries research on the West African coast and East Atlantic tropical region.
21. SEYCHELLES	1	SEY (A)	Fishery-oriented research chemical and biological oceanography.
22. SIERRA LEONE	3	SL (A)	Physical chemical geological and biological oceanography research and training.
		SL (B)	Marine geology and engineering soil mechanics research and training.
		SL (C)	Studies of the physical and biological conditions in the seas especially as they affect the fisheries training for young scientists and technicians.
23. SUDAN	2	SUD (A)	Oceanographic research and training.
		SUD (B)	Applied fisheries research fresh-water and marine.
24. TANZANIA	4	TAN (A)	Research and Training in biological chemical physical and geological oceanography; and fisheries.

COUNTRY	NO. OF INSTITUTIONS	NAME OF INSTITUTIONS BY CODE)	RELEVANT PROGRAMMES (Research/Training)
		TAN (B)	Applied fisheries research and training.
		TAN (C)	Research and training in aspects of marine ecology, fish stocks, primary productivity and oceanography of inshore waters.
		TAN (D)	Training personnel for the coastal and inland fishery.
25. TUNISIA		TUN (A)	Applied research in marine science training courses in chemical oceanography, marine pollution and mariculture.
		TUN (B)	Basic and applied research including control of the quality of coastal waters.

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PROGRESS REPORT ON THE IMPLEMENTATION OF RESOLUTION 578 (XXI) ON THE AFRICAN MINISTERIAL CONFERENCE ON THE ENVIRONMENT

I. INTRODUCTION

1. This report gives a brief background to the first African Ministerial Conference on the Environment held in Cairo from 15 to 18 December 1985 and examines the progress being made by ECA in contributing to the implementation of the Cairo Programme of Action which emanated from the Conference.

II. BACKGROUND

2. It will be recalled that the first African Ministerial Conference on the Environment was held in Cairo, Egypt in December 1985. The meeting was held in response to UNEP Governing Council decision 11/7 of May 1983 which, among other things:

(a) Requested the Executive Director of UNEP to accord high priority in the provision of assistance to African countries in dealing with their most urgent environmental problems in Africa;

(b) Invited the governments of Africa to convene, in co-operation with regional organizations and institutions, an African Environment Conference to discuss national environmental priorities and identify common problems worthy of a regional programme of action to deal with serious environmental problems in Africa.1/ ECA and OAU participated with UNEP, in the implementation of this resolution right from the preparatory stages.

3. The executive Director of UNEP, in co-operation with OAU and ECA, and in consultation with a number of African Governments and United Nations agencies, immediately began the groundwork for the Conference. The Conference laid down guidelines for a programme of work, an important aspect of which was the development and/or the enhancing of regional networks for environmental management in Africa. The eight suggested networks were:2/

(a) Environmental management;

4. This network is supposed to bring together existing national technical departments, subregional institutions particularly remote sensing centres and regional institutions to form a regional environmental monitoring system.

1/ See African Environmental Conference: Report of the Executive Director of the United Nations Environment Programme, prepared in consultation with the United Nations Economic Commission for Africa (ECA) and the Organization of African Unity (OAU), UNEP document No. UNEP/AEC/IAWG/8, Sept. 1985.

2/ See African Environmental Conference: Report of the Executive Director of the United Nations Environment Programme; document No. UNEP/AEC/IAWG/8, Sept. 1985.

(b) Climatology;

5. The climatology network would be closely connected with the activities to be carried out in pursuance of ECA Conference of Ministers resolution 528 (XIX) adopted in May 1984, as well as ongoing WMO activities in the region, especially the proposed African Centre of Meteorological Applications for Development (ACMAD).

(c) Soil studies including fertilizers;

6. The activities of network would promote the establishment of links between soil studies departments and centres in Africa and its functions would include addressing the issues involved in the production of cheap soil amelioration measures and fertilizers.

(d) Water resources;

7. The network on water resources is supposed to address both quantitative and qualitative aspects of water, in particular issues relating to monitoring of the quality of surface and underground water.

(e) Renewable sources of energy;

8. Drawing on national, subregional and regional machineries, this network would promote the speedy development of practical projects, the dissemination of technical information and the training of personnel.

(f) Conservation of genetic resources:

9. This network would cover natural resources and protected areas, germplasm banks in Africa and promote the dissemination of related information.

(g) Science and technology;

10. The network would forge links between national institutions working in the field of science and technology and research and development.

(h) Environmental education and training.

11. The activities of this network would include the promotion of environmental education in schools and institutes of higher education as well as focus on training farmers and stock breeders in proven techniques. The activities of these networks would be integrated by participating agencies into their relevant network activities as the case may be.

12. Added to these networks were regional pilot projects which would be aimed at utilizing "all available African skills and experience to seek economically feasible, environmentally sound and socially acceptable solutions to the complex problems of grassroot development, in 150 villages and 30 semi-arid stock-raising zones". There were also subregional activities which

were classified under four headings, corresponding to the principal natural units of Africa, namely: deserts and arid lands; river and lake basins; forests and woodlands; and seas.3/

13. In its resolution 1 the Cairo Conference recommended that it should take over the present functions of ECA's Joint Intergovernmental Regional Committee on Human Settlements and Environment.

III. ECA ACTIVITIES AFTER THE CONFERENCE

14. A report E/ECA/CM.12/27 on the Conference was made to the twenty-first session of the ECA Conference of Ministers in April 1986 which adopted its resolution 578 (XXI); part III dealt with the Institutionalization of the African Ministerial Conference on the Environment. It endorsed:

(a) "The institutionalization of the African Ministerial Conference on the Environment to meet every two years to review the Cairo Programme for African Co-operation on the Environment and Eco-development; and

(b) Decided "that the existing Joint Intergovernmental Regional Committee on Human Settlements and Environment, whose establishment was decided upon in the Lagos Plan of Action and by General Assembly resolution 32/162 of 19 December 1977 and Conference of Ministers resolutions 316 (XII) of February 1975 and 408 (XVI) of 10 April 1981, should serve as the Technical Advisory Working Group of African Experts to the African Ministerial Conference on the Environment"; the resolution also

(c) Recommended that "the Executive Secretary consult with the Executive Director of the United Nations Environment Programme, the Executive Director of the United Nations Centre for Human Settlements (Habitat) and the Secretary-General of the Organization of African Unity in order to establish modalities for co-operation between the Joint Intergovernmental Regional Committee on Human Settlements and Environment and the African Ministerial Conference on the Environment and to ascertain the legal status of the latter within the United Nations system, and to report to the Commission at its twenty-second session in 1987".

15. In July 1986 the first meeting of the Interagency Working Group (IAWG) of the Conference was held in Geneva, Switzerland. This group was set up by the Conference and has the mandate to co-ordinate the activities of the international agencies in relation to the implementation of the Cairo Programme and to serve as a scientific and technical advisory body to the Bureau of the Conference through the permanent Secretariat. The meeting had as its main task, the distribution of responsibilities, particularly regarding the functioning of the regional networks. The other important matter was that of the resources for implementing the programme. The Executive Director of UNEP informed the IAWG that of the forty-one countries that were a party to the Conference, five have expressed reservations on the figures for their

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3/ See report of the Executive Director, op.cit, p.22.

contribution as being too high. Of the remaining thirty-six, four have indicated their acceptance of their share, sixteen have indicated that they have already presented the matter to the department responsible for dealing with such matters.

16. As concerns the mentioned earlier networks, ECA accepted to take on the responsibility of four, if the resources for their implementation were made available by the Conference. These included:

(a) Environmental monitoring: Negotiations would be made with the Regional Remote Sensing Centre in Ouagadougou, the Regional Centre for services in Surveying, Mapping and Remote Sensing (RCSSMRS) in Nairobi and the Regional Centre for Training in Aerial Survey at Ile-Ife (RECTAS) for the possibilities of their handling this;

(b) Water resources: Arrangements would be made with the Water Resources Unit of the Natural Resources Division at ECA for it to handle this, as well as the one for renewable sources of energy;

(c) Science and Technology: Arrangements would be made with the African Regional Centre for Technology in Dakar and with the Science and Technology Unit in the Natural Resources Division of ECA to deal with this;

(d) Environmental Education and Training: The Environment Section at ECA would handle this area as it is presently involved in a Joint project with UNEP on the introduction of environmental components into the training programmes of ECA-sponsored institutions. It is useful to note here that these institutions are backed by contributions from member States who actively participate in the policy orientations of the institutions.

17. With the above arrangements in mind, the Environment in Africa work programme budget that is being proposed for 1988-1989, provides for the inclusion of these activities. However, this does not preclude the situation that, if the Conference makes the necessary resources available earlier, implementation would immediately begin.

IV. IMPLEMENTATION OF THE CAIRO PROGRAMME OF ACTION

18. Following on the advisory meeting of the Interagency Working Group, the Executive Secretary of ECA wrote to UNEP to confirm the offers made, for ECA to host four of the eight regional networks as stated earlier. He also suggested to the Executive Director of UNEP that, since the ECA was unable to provide one member of its three-member professional staff in the Environment Co-ordinating Section to work on a full-time basis at the Conference Secretariat, a programme of work for the latter should be drawn up between UNEP, ECA and the OAU to enable ECA to contribute more fully to the work of the Conference Secretariat for the implementation of the Cairo Programme of Action. Such a work programme has now been drawn up when the ECA Chief of the Environment spent a working week at the Conference Secretariat in Nairobi last November 1986. The programme of work for the Conference

Secretariat has now made provisions for ECA to provide similar working periods in Nairobi to assist in the preparations of documents and organization of meetings up to the second meeting of the African Ministerial Conference on the Environment and the UNEP Governing Council at its fourteenth session in June 1987.

19. The First meeting of the Conference (AMCEN) Bureau took place at UNEP, Nairobi, 7 to 9 October 1986. ECA was unable to attend the Bureau meeting because it was engaged in organizing the ECA/WMO Interagency Expert Consultations on the establishment of the Centre ACMAD in Bujumbura, Burundi 8 to 10 October 1986 at the same time. From the report of the Bureau meeting submitted as document UNEP/AEC/B1/10, the following summary of activities indicate the progress which has been made in the implementation of the Cairo Programme of Action, following on the institutionalization of the African Ministerial Conference on the Environment:

(a) The Conference Secretariat has been established at UNEP, Nairobi;

(b) The four Conference Committees on (i) deserts and arid lands, (ii) forests and woodlands; (iii) rivers and lake basins; and (iv) seas, have been established. The Chairman for the Desert and Arid Lands Committee, H.E. Cheikh A. Khadre Cissokho, Minister for the Protection of Nature in Senegal, proposed a programme for the Committee. Based on the discussion on the programme, the Bureau requested the Conference Secretariat to prepare guidelines for the operational and organizational arrangements for the Committees. The guidelines were considered by the Bureau meeting and each of the remaining Committees is now engaged in preparing its own draft terms of reference. This will comprise of three sections: first, the structure dealing with membership, national focal points as African experts, as well as observers and experts from the United Nations, IGOs and NGOs, and their linkages, a small secretariat, and the technical tools required; secondly, a work plan with priorities will be drawn up; and thirdly, the financial resources required in a proposed budget with provisions for evaluation to be built in;

(c) Establish and/or strengthen the eight technical co-operation networks. The Bureau meeting decided to approve, after a general discussion: firstly, the terms of reference for the eight networks; secondly, the criteria for the selection of institutions for the networks prepared by the Secretariat and the application of such criteria to institutions nominated by Governments; thirdly, that preference should be given to African institutions with the requisite standing and record in the selection of institutions as focal points for the networks. Other existing institutions in the Africa region are expected to support the selected national institutions. Based on these criteria and taking into consideration the report of the Interagency Working Group, the Bureau decided to locate the Regional Co-ordinating Units for the five priority networks as follows: Environmental Monitoring at UNEP/GEMS temporarily:

(i) Climatology at WMO's Centre is hosted;

(ii) Soils and fertilizers at the Bil Research Institute of the Council for Scientific and Industrial Research, Kumasi, Ghana:

(iii) Energy at the Centre for the Study and Research on Renewable Sources of Energy in Dakar, Senegal;

(iv) Water resources at the Water Resources Institute, in Cairo, Egypt.

(d) The programme of pilot projects for food and energy self-sufficiency in 150 villages and in 30 semi-arid stock-raising sites, is now being implemented. After discussion, the Bureau decided that the Conference Secretariat should proceed to arrange support for implementing pilot projects according to certain criteria agreed upon which are based on earmarked IPF or voluntary contributions and on the identification of named villages and/or semi-arid stock-raising sites by the Governments.

20. The Bureau meeting also examined the responses from each of the African countries to the questionnaire sent out earlier by the Conference Secretariat on (a) request for names and positions of African nationals to serve as experts in the four Conference Committees; (b) request for national institutions to function as focal points within any of the eight technical co-operation networks; (c) request for names of three selected villages and/or a stock-raising site in a semi-arid zone in the country for the pilot projects; and (d) on arrangements for voluntary financial contribution to the Programme.

21. Finally the first Bureau meeting considered the financial situation for the implementation of the Cairo Programme of Action. The Bureau decided that the President of the African Ministerial Conference on the Environment and the Conference Secretariat should direct further appeals to governments, with the Vice-Presidents dealing with their respective subregions, in order to urge the finalization of the arrangements being made by the governments to finance the Programme of Action.

22. The Conference Bureau then dealt briefly on the relationships between the United Nations Programme of Action for African Economic Recovery and Development and its related African Priority Programme for Economic Recovery (APPER) 1986-1990. Then it announced that the Second meeting of the African Ministerial Conference on the Environment will take place in Nairobi from 2 to 4 June 1987 to be preceded by: (a) meetings of each of the four Conference Committees in February 1987 except Seas Committee; (b) Second meeting of the Interagency Working Group at IFAD, Rome in March 1987; and (c) the Second meeting of the Conference Bureau at the end of March 1987 in Cairo or Harare.

CONCLUSIONS

23. This ECA subsidiary body, the Joint Intergovernmental Regional Committee on Human Settlements and Environment has been proposed to serve as an advisory body of African experts to the African Ministerial Conference on the Environment (AMCEN) under ECA resolution 570 (XXI) at the twelfth meeting of the ECA Conference of Ministers at Yaounde, Cameroon in April 1986. This fourth meeting of the Joint Committee is called upon to examine the work done so far and to make positive recommendations on the implementation of the Cairo Programme of Action, 1986-1991. It is noted that the proposed Environment in Africa Work Programme for the 1988-1989 biennium already contain elements of the decisions of the African Ministerial Conference on the Environment in its planned activities.

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LC/NAIROBI

REPORT OF ECA/WMO INTERAGENCY EXPERT CONSULTATION ON ESTABLISHING THE AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT (ACMAD)*

Bujumbura, Burundi, 6-10 October 1986

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A. PARTICIPATION AND ORGANIZATION OF WORK

1. An ECA/WMO Inter-Agency Expert Consultation on Establishing the African Centre of Metrological Applications for Development (ACMAD) was held at the WMO Regional Office for Africa at Bujumbura, Burundi from 8-10 October 1986. It was organized by WMO jointly with the ECA.

2. The meeting was convened in response to United Nations Economic Commission for Africa (ECA) resolution 585(XXI) of April 1986 which requested the Executive Secretary of the ECA and the Secretary-General of World Meteorological Organisation (WMO) to prepare the draft constitution of the ACMAD centre and submit it through the Joint Intergovernmental Regional Committee on Human Settlements and Environment to the Conference of Ministers of its thirteenth meeting. Other activities considered related to the technical details regarding the Centre, the host country agreement and the financial resources.

3. The meeting was attended by the Members of an ad-hoc group on ACMAD which was established by the WMO's Second Technical Conference on the Management of Meteorological Services in Africa held in Bujumbura, in November 1985. The members of the ad-hoc group were selected on a subregional basis to assist WMO and ECA in the establishment of ACMAD. The group is to be chaired by the President of WMO Regional Association I (Africa). Subregions of Africa were represented as follows:

North African subregion - Egypt
West African subregion - Mali
Central African subregion - Burundi
East African subregion - Kenya
Southern African subregion - Malawi.

4. The meeting was attended by the Members of the ad-hoc group mentioned above and by representatives from UNDP, UNESCO, ECA, WMO and invited observers from the U.K. The list of participants is given in Annex 4.

5. Mr. W. Degefu, the President of WMO Regional Association I (Africa) (RA-I) chaired the meeting and Mr. B. K. Mlenga (Malawi) was elected Rapporteur.

B. AGENDA

6. The following agenda was unaimously adopted:

1. Opening of the meeting.
2. Election of Officers.
3. Adoption of the Provisional Agenda and Organization of Work.
4. Fullscale project document for ACMAD Technical details.

5. Draft Constitution of the Centre,
6. Host Country Agreement and Criteria for Hosting Centre.
7. Financing of the Centre by Member States and donros.
8. Any other business.
9. Adoption of the Report and Closure of the Meeting.

C. PROCEEDINGS

Opening of the Meeting (Agenda item 1)

7. The Director of WMO Regional Office for Africa, Mr. S. Chacowry introduced the chairman of the ad-hoc InterAgency Consultation as previously agreed upon (see paragraph 3 above). Mr. W. Degefu who is President of WMO Regional Association I (Africa) opened the meeting after welcoming the participants and thanking the Government of Burundi for the facilities made available to the meeting and reiterated the purpose of the ad-hoc group meeting as stated in paragraph 2 above, after pointing out the historical background to the establishment of the centre ACMAD.

8. The representative of the Secretary-General of WMO, Mr. S. Chacowry welcomed the participants and stated that the idea of establishing an advanced centre of excellence for the application of meteorology to socio-economic development was first put forward by Prof. G.O.P. Obasi, as a lecturer at a WMO training workshop on meterological services held in Algiers in December 1970. Fifteen years later, it was the spectre of hunger and famine due to the prolonged drought ravaging Africa and another intervention by Prof. G.O.P. Obasi and now Secretary-General of WMO which led to the crystalization of the idea for immediate action to be taken by African Governments. He noted that the idea for creating such a centre has had strong inter-agency support in producing the first project document in 1984 which was discussed for technical details at the WMO Second Technical Conference on the Management of Meteorological Services in Africa in November 1985 at Bujumbura by the Permanent Representatives of WMO's Regional Association I (Africa). He pointed out that a "critical mass" is required in the form of computer and telecommunications facilities, personnel as well as national infrastructure in meteorological services for the success of such an advanced centre. Finally, he expressed thanks to potential donors such as the UNDP and the Overseas Development Administration (ODA) for the interest shown on the project and to the Government of Burundi for its unstinted support in the organization of the meeting.

9. The representative of the Executive Secretary of ECA, Mr. N.H. Ayodele Cole, Chief of Environment, welcomed the participants to the joint ECA/WMO expert group meeting which was detailed to prepare a draft constitution, a draft host country agreement and to examine the technical details and financial resources for finalizing a project document for the establishment of the advanced centre ACMAD. He pointed out that the idea of creating such a Centre came to the attention of African governments at the tenth ECA Conference of Ministers in April 1984 when the Report of the Scientific Round Table on the climatic

situation and drought in Africa was being considered. The African member States decided to establish the Centre ACMAD by ECA resolution 540(XX) at the following (eleventh) Conference of Ministers as a result of strong inter-agency support on preliminary studies. He noted that the spade work for the establishment of the Centre was also receiving strong support from African experts and Permanent Representatives of WMO to ensure the successful functioning of such a Centre.

10. He pointed out that the creation of the Centre ACMAD should be seen within the context of Africa Priority Programme for Economic Recovery (APPER) adopted at the Assembly of Heads of State and Government of the Organization of African Unity (OAU) in July 1985, and which was consolidated as the United Nations Programme of Action for Africa's Economic Recovery and Development 1986-1990, at the thirteenth special session of the General Assembly in May 1986 on the Economic and Social Crisis in Africa. Finally, he pointed out that the primary cause for initiating action to create such a centre was the prolonged drought which was now abating with the return of the rains. However, African governments must be reminded that there were other common climate-determined natural disasters such as floods, tropical cyclones afflicting the continent which need an early warning system and constant monitoring. Also, drought was sure to return to the aridlands of Africa but when, no one can predict without the scientific study that can take place in an advanced centre such an ACMAD.

Fullscale Project Document of ACMAD - Technical Details (Agenda item 4)

11. The meeting reviewed the fullscale project document in the light of additional technical details provided by the WMO consultants recruited under the preparatory assistance project to prepare a suitable implementation plan based on a survey to be undertaken in relation to the establishment of ACMAD. The meeting discussed, in particular, the substantive items concerning the objectives, functions, activities, outputs, the work programme, organizational structure (both internal and external), the manpower, material and financial requirements as well as the economic benefits of ACMAD.

Objectives

12. Therefore the main long-term objective of ACMAD should be to contribute towards the socio-economic development of the African countries particularly by assisting them in their effort towards self-sufficiency in food production, water resource management, and energy. Specifically, ACMAD will:

(a) strenthen the capabilities of national units and promote the development of manpower capabilities in the application and use of meteorological/climatological data;

(b) provide a meteorological/climatological early warning watch system based on the state-ofthe-art methodologies for analysis and prediction;

(c) also develop new and practical methodologies for meteorological applications in order to:

- reduce variability and risk of losses in food crop productions;
- reduce costs and energy inputs in food crop production;
- increase food production and strengthen food security;
- improve water resources management, especially in droughtprone and drought-stricken areas;
- develop alternative renewable energy sources;

(d) provide a better understanding of the atmospheric conditions prevailing in the Africa region which affect critical human activities;

(e) act as an African "centre of excellence2 in meteorological applications to development, including provisions for scientific research and training.

13. The meeting agreed that one of the objectives of ACMAD which should be stressed is the strengthening of the National Weather Services to enable them to take full advantage of development opportunities offered by the Centre in support of their respective national economies. The Centre could in turn make optimum use of existing resources in each country and ensure a mutually beneficial interaction.

14. The meeting noted the role of ACMAD as outlined by the WMO consultants and agreed that the Centre should aim of focussing on developing those aspects of meteorology which are not catered for by the national and subregional centres. The most critical gaps in the applications of meteorology are in the areas of acquiring and adapting agrometeorological techniques which have been successfully applied elsewhere to promote self-sufficiency in food production and in energy resources, to address the many pressing issues of drought and other climate/weatherrelated disasters (like flood, pests control), and to foster crop diversification. Another area of application would be in the evaluation and application of modern numerical analysis and prediction methods as a means of maintaining a continental meteorological/climatological watch system. Statistical and empirical methods should also be tested and adapted for use in the African region. ACMAD would function primarily at the continental scale and serve as a bridge in carrying such knowledge and methods to the subregional and national levels.

15. The meeting agreed that the greatest contribution that ACMAD can make to African economic development was as a "Centre of excellence" in meteorological applications and as such, ACMAD will be the source of advancement of expertise, knowledge and facilities required in Africa to enrich existing training and

development programmes and to stimulate much needed applied research in such areas as tropical meteorology and rain-producing systems. These would require a "critical mass" of experts and technical facilities at the Centre. The meeting felt that ACMAD should be established close to existing professional training and applied research institutions to optimize investments. Consequently, research and training would be by-products of the functions related to establishing "State-of-the-art" facilities and expertise in a meteorological/climatological watch system and application methodologies.

16. The long-term objectives should ensure the total development of the whole meteorological system in a harmonious manner. As such, the Centre should deal with all meteorological phenomena of concern to the continent and be sensitive to the evolving needs of Africa.

Functions

17. The meeting agreed that the primary functional areas of ACMAD should be, namely;

(a) applications development;

(b) meteorological/climatological watch operations,

(c) numerical analysis and prediction development; and

(d) informatics and satallite meteorology technology support.

The meeting considered that efficient and reliable telecommunication facilities for the collection of data and distribution of products were essential.

18. The meeting discussed the proposed Applications development Unit of ACMAD and its activities. The technical requirements would among others, relate to the archiving of all historical and current data, provision of uniform data format, ensuring efficient data/product exchange on existing GTS system and assist in defining new requirements. It will carry out operational functions such as; forecasting yield for crops; identification of appropriate methodologies for operational purposes; determination of meteorological conditions for the occurrence of migratory pests and diseases; and monitoring of continental drought and climatic anomalies. It will conduct specialized application-oriented, short-term courses. Applied research should be carried out to further the objectives of the Centre and as such facilitate and participate in identifying problems areas which require urgent consideration on a continental scale.

19. The meeting discussed the activities and outputs of the Metrological/Climatological Watch System of ACMAD and a preliminary list is annexed (Annex 2). The meeting proposed a few additions to the list as follows: low level wind trajectories, vertical motion analysis (VMA), model output statistics (MOS). The meeting requested members of the ad-hoc group to send in further proposals, if any, to WMO Secretariat before the end of November 1986.

20. The meeting considered the function of the proposed Numerical Analysis and Prediction Development Unit of ACMAD for the transfer and application of numerical methods for conventional and satellite data assimilation, derivation of diagnostic dynamic and kinematic fields from model grid point analysis and prediction, and quantitative precipitation (and other weather elements), analysis and prediction by physical, statistical and empirical methods. The meeting recommended that ACMAD should, as far as possible, use the existing facilities and improve upon them to suit the African condition. The meeting noted that the programme objective and output of the division will be evolutionary. ACMAD would, in the first instance, relay grid point data from world centres and distribute them after appropriate adaptation. The meeting noted that this would lessen the requirement for on-site computing capabilities in the initial phase of implementation as was initially anticipated.

21. The meeting considered the activities of the proposed Informatics and Satellite Meteorology Technology Support Unit of ACMAD which will be responsible for all aspects of informatic system support, large scale computing services, data, management, communications, electronic maintenance and satellite facilities. These are most critical for the operation of the Centre.

Organizational Structure of ACMAD

22. The meeting considered the organization structure of ACMAD which consists of four functional units given in paragraph 17 above and as shown in Annex 1. It is noted that the Director of the Centre is assisted by a Deputy and two Assistant Director who will each control a unit. The Deputy-Director will be responsible for operational activities of the Centre as well as deputising for the Director. The meeting felt that there was a need for stringent financial control and that provision should be made for both internal and external auditing.

23. The meeting addressed the question of the interrelationship between ACMAD and the existing meteorologically-related institutions and the World Weather Watch (WWW) of WMO. The meeting recommended that duplication of effort should be avoided and specialized Regional Centres within the Africa region should be strongly interlinked to ACMAD to receive all necessary products from the Centre for their operational work. Furthermore, as regards the position of ACMAD in the WMO WWW System, it recommended that the ninth session of RA I should consider the matter.

Work Programme and Staff Requirements

24. The meeting considered that a work programme and staff requirements for ACMAD were very much integrated with the internal functional organization produced as a draft organogram for the Centre (Annex 1). It was agreed that a core staff of about 30 professionals and technicians was necessary for ACMAD to take off during its developmental phase of five years. During the preparatory assistance phase, WMO consultants will propose a work programme for ACMAD and draw up job descriptions for the professional and technical staff with regards to the secondment of staff from the United Nations specialized agencies, the meeting was informed of the difficulties involved, unless the organizations were able to use extrabudgetary or overhead resources from technical assistance provisions. The meeting agreed that the general service support staff should be budgeted for, and not left to be provided for by the host government.

Material and Financial Requirements

25. The meeting considered that a total sum of US$ 18.5 million would be about adequate for the level of activity envisaged for the first five year development phase of ACMAD in the project document. However, to make ACMAD full operational in the first phase, additional funding would be required from donors and participating countries. The equipment listed in the Annex of the fullscale project document of ACMAD would cover the operational needs of the Centre in the first phase.

26. The meeting stressed that due consideration should be given to recurring costs, such as running the Centre and the maintenance of facilities. The meeting was informed that the detailed specifications of equipment required for ACMAD will be derived from the results of the joint ECA/WMO study on telecommunications in Africa to be funded by the Federal Republic of Germany.

Draft Constitution of the Centre (Agenda item 5)

27. In introducing this agenda item, the ECA representative stated that he could deal with the paper under four headings, namely, background documents used in drafting the Constitution; general features of the Draft Constitution; matters excluded from the Draft Constitution; and procedure for bringing the Constitution into force.

28. He listed the background documents used as the Report of the WMO Second Technical Conference on Management of Meteorological Services in Africa held in Bujumbura, Burundi, 13-18 November 1985; the Report of the Scientific Round Table, Addis Ababa, April 1986; Preparatory Assistance Project document (RAF/86/026); Draft fullscale project document; and Constitutions of several ECA-Sponsored Institutions.

29. The draft Constitution itself had been couched in general terms as befitted a framework constitutive statute of a dynamic institution. He then proceeded to analyse the draft Consitution Article by Article.

30. No provision was made in the draft Constitution for an Assembly in view of previous resolution of the ECA Conference of Ministers putting a moratorium of indefinite duration, for financial reasons, on the establishment of new institutions. Also, details of Technical Committees, Financing Regulations, Staff Rules did not belong to a Constitution but could be dealt with separately at a later date.

31. The method recommended for bringing the Constitution into force was for the ECA Conference of Ministers to adopt a resolution, with the Constitution annexed to it. Once such a resolution was adopted, it would bind all 50 member States of the ECA without further ado. This must be explained clearly to the Conference of Ministers so that no Member State is taken by surprise when called upon at a later stage to contribute to the budget of the Centre.

32. The Representative of WMO presented to the meeting the views of the WMO Secretariat on the ACMAD Constitution and referred to a draft convention provided to the meeting. He indicated that there was a need to integrate some of its elements in the draft Constitution proposed by ECA which reflected all the major articles needed.

33. In the discussion that followed, the experts noted that the objectives of the Centre should be revised, as necessary, in the light of decisions reached at this Expert Group meeting. The following amendments were recommended in the draft constitution:

- the draft would spell it out clearly that the supreme body of ACMAD is the ECA Conference of Ministers (to which the Governing Board reports through the Joint Intergovernmental Regional Committee on Human Settlements and Environment);

- sub-paragraph (c) of paragraph 2 of Article 5 would be re-drafted so as to specify that the ten representatives from each of 5 ECA subregions would be persons well versed and experienced in the theory and practice of meteorology and would be selected on the grounds only of such technical competence;

- the respective roles of ECA and WMO visa-vis ACMAD would be spelt out clearly in the Constitution (see Article 10)

- the OAU would be included in the membership of the Board of Governors of ACMAD [see Article 5, paragraph 2(e)]

- sub-paragraph (a) of paragraph 2 of Article 5 should be amended to provide for the Chairman of the Board of Governors to be elected from among the representatives of the Member States;

- the representatives referred to in sub-paragraphs (e) to (h) of paragraph 2 of Article 5 would participate in the work of the Board of Governors in an observer capacity;

- article 6 would be amended to reflect the procedure to be followed in between meetings of the Board of Governors;

- paragraph 2 of Article 6 would be deleted;

- the functions and powers of the Executive Director would be reviewed to enable him to function in the absence of the Chairman of the Board (see Article 7)

- paragraph 2 of Article 7 would be amended by substituting "four years" for "two years" in lines 2 and 3;

- the "junior posts" referred to in subparagraph (e) of paragraph 4 of Article 7 shall be specified;

- paragraph (a) of Article 9 shall be amended by inserting the world "timely" between "the" and "collection" in the first line;

- "Centre" shall be substituted for "institute" in line 1 of paragraph 1 of Article 12;

- Article 13 shall be clarified.

34. Finally, the meeting agreed that since ECA and WMO had been unable, because of time constraints, to harmonize their two draft Constitutions, they would meet at a mutually agreed place and date to finalize an agreed text having regard to the amendments made to the ECA draft Constitution which was the subject of the above disucssion. The revised version of the draft constitution is annexed to this report (Annex 3).

Draft Hosting Agreement between ACMAD and the Host Country - Criteria for the Location (agenda item 6)

35. The ECA representative explained that this was a standard agreement for ECA-sponsored institutions and recommended its adoption. The meeting agreed to it.

Criteria for the location of the Centre

36. The meeting reviewed the technical requirements for the location of the Centre ACMAD submitted by WMO. After in-depth discussions, it was agreed that the host country should have the following facilities:

- A University which has recognized capability in training and in applied research, particularly in tropical meteorology and other essential disciplines such as Mathematics, Physics and Computer Sciences;

- A Regional Telecommunications Hub (RTH) with functional automated MSS and a Regional Meteorological Centre (RMC), located preferably in the trunk circuit of the WMO Global Telecommunications System (GTS) in order to have ready access to meteorological data available on the WMO World Weater Watch (WWW) Systems;

- Adequate data processing facilities (computer hardware, software, expertise for the operations, and maintenance of the systems, etc), to be used by ACMAD during the initial stages for its needs and requirements;

- Satellite data receiving and processing capabilities;

- Ready access to research and applications institutions both in Africa and outside the region, in agriculture, forestry, water resources management, renewable energy and environment aimed at tackling the problems of drought, desertification and food self-sufficiency;

- Physical facilities to accomodate the Centre, with possibilities of expansion.

37. The meeting also agreed that these facilities should all be available and fully operational in the host country to permit the establishment of ACMAD during 1987.

38. The meeting noted that the ECA Conference of Ministers had directed the Executive Secretary of ECA to investigate the possibility for potential candidates for hosting ACMAD. It recommended that, in view of the interest expressed during the last session of the ECA Conference of Ministers, and considering the results of the first preliminary study regarding potential host countreis, the ECA and WMO Secretariats consult, as soon as possible, the governments of these countries on their interest to host ACMAD. The ECA and WMO Secretariats should ensure that missions are carried out to these countries who would express an interest to host the Centre with the view of providing the ECA Conference of Ministers with all the details required on the the existing facilities to enable them to decide objectively on the location of ACMAD.

39. The meeting further recommended that the attention of the ECA Conference of Ministers be drawn on the critical importance of the technical facilities to be available in the host country, if the establishment and operation of ACMAD are to be fulfilled successfully. The initial investments required could also be substantially increased depending on the site of the Centre.

Financing of the Centre by Member States and Donors (agenda item 7)

40. The representative of WMO noted that African countries were at present undergoing severe financial strain due to the current social and economic crisis. In order to ensure continued financing of ACMAD, WMO was of the opinion that Member States should contribute to the Centre through an

Intergovernmental organization such as the OAU. He cited examples of the AGRHYMET Centre and the ASECNA training schools whose operations are financed by the contributions of Member States through the parent organizations, namely CILSS and ASECNA respectively. Considering the present economic difficulties encountered, WMO would suggest that the take off of ACMAD could be ensured provided sufficient external support were made available to the Centre in the initial 5-year period. The Members, however, should provide their full commitment to the Centre from the start, and progressively increase their contribution.

41. The representative of ECA noted that financing was the most critical problem common to all ECA-sponsored institutions at the initial phase because of foreign exchange problems. Generally, the level of contribution is based on a modified OAU formula agreed upon at the ECA Conference of Ministers when the matter was being considered.

42. The meeting agreed that an ECA/WMO study on the financing scheme of the Centre be carried out as soon as possible in time for submission to the appropriate ECA bodies. This was necessary to ensure an interrupted flow of products from the Centre when member States begin to depend on the meteorological outputs and economic development.

43. The representative of the United Kingdom's Overseas Development Administration (ODA) said he could not commit his government at this stage, however, he expressed strong interest to assist the Centre's training programme and the access to computer facilities, provided the organization of the Centre was meeting the objectives of ACMAD in a cost-effective way.

44. He recommended that the social and economic benefits of ACMAD should be clearly spelt out to the politicians and decision-makers with regard to the present economic and social crisis in Africa. Finally he mentioned that ECA/WMO contact other potential donors such as the World Bank who was developing a programme on agricultural research in Africa for food self-sufficiency.

45. The representative of UNDP stated that UNDP has not committed itself to finance the project. However, he reconfirmed the interest of the Regional Bureau for Africa in the concept, which has already been shown by funding the preparatory assistance phase of the project.

46. The representative of ECA informed the meeting that a proposal for funding ACMAD was submitted by ECA to UNDP under its fourth regional programme. Decision on the selection of the proposals for UNDP funding will be taken by the ECA Member States at their extra-ordinary session on 13-14 October 1986. The ad-hoc meeting expressed the hope that a positive response will be received on this proposal for UNDP to fund ACMAD.

47. The meeting expressed its gratitude to the ODA and the UNDP for their continuing interest and support to ACMAD.

Any other business (agenda item 8)

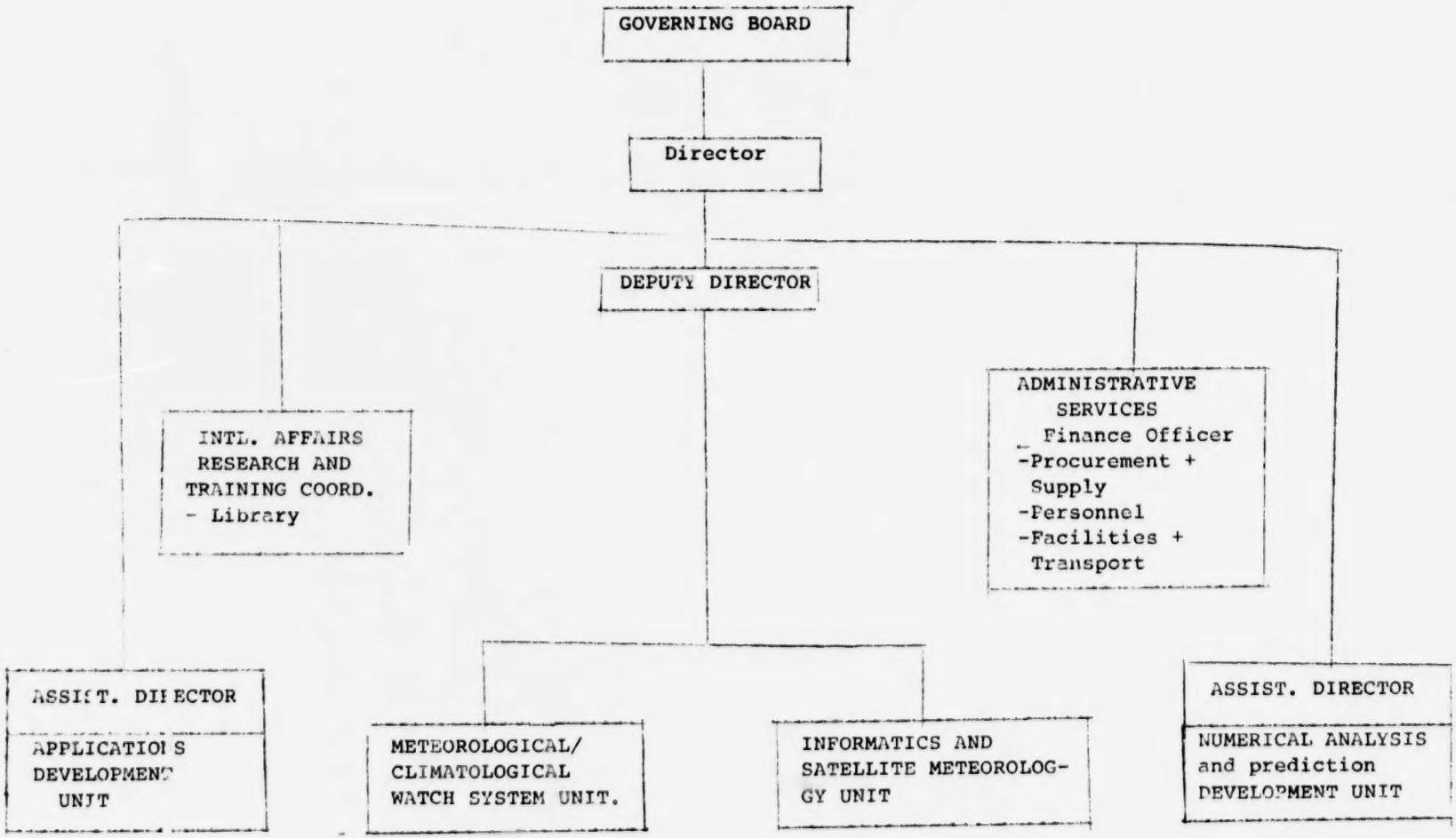
48. The meeting recommended that should further assistance be required to finalize the preparatory phase and the necessary arrangements towards the implementation of ACMAD within the preparatory assistance project phase, the ad-hoc Working Group may again be called upon to provide the necessary support and advice.

Closure of the meeting (agenda item 9)

49. The Chairman thanked the rapporteur, the participants, the consultants, the United Nations agencies represented and the participants of ODA and the British Meteorological Office for their useful contributions to the success of the meeting. He also thanked the staff of the Regional Office for the support provided and in particular, he requested Mr. E. Kayengeyenge, Permanent Representative of Burundi with WMO to convey the gratitude of the meeting to the Burundi Government for all the arrangements made in support of the meeting.

50. The meeting was closed at 2100 hours on 10 October 1986.

A C M A D O R G A N O G R A M



Objective:

A. Maintain a Meteorological/Climatological Watch System for Africa (ACMAP)

Activities & Outputs

A.1 Prepare for dissemination and digital archive the following operational analysis and monitoring products on a continental basis:

A.1.1 Daily Continental Synoptic Analysis 00z and 12z (sfc and U/A)

A.1.1.1-A.1.1.7 (Sfc, 850, 500, 200, Trop/VWS based on the grid point objective: analysis from a world centre)

A.1.2 Daily Continental Analysis of Significant Weather Climate and Meteorological Structures and Fields for Applications (numerically and subjectively derived).

A.1.2.1 24hr. Rainfall and cloudiness (per cent avial. sunshine) at 12z using synoptic data plus satellite, RAINSAT, radar, and special diagnostic techniques

A.1.2.2 Rain Producing Systems diagnotic fields at 12z including stability, parameters, moisture and heatflux fields, kinimatic fields, (e.g. 850 and 200 mb stream function and velocity potential, derived convergence/divergence and vertical velocity)

A.1.3 Daily Climatological Bulletins (Temp, pcpn, degree days, soil moisture/temp, per cent normal todate, etc. for selected continental stations) 12z

A.1.4 Weekly, Monthly and Seasonal Continental Climat Monitoring Products

A.1.4.1 Historical (space and time averaged) meteorological fields (sfc and UA as related to tropical meteorological analysis and prediction)

A.1.4.2 Accumulative meteorological and climatological indicators (per cent normals, outgoing long-wave radiation, degree days, soil moisture, drought indice for particular season todate)

A.2 Prepare for dissemination and digital archive Continental Prognosis and Assessments:

A.2.1 Daily Continental Weather Prognosis for 24, 48 and 72 hr. (sic/500, QPFs, per cent possible sunshine, maximum/minimum temperature, etc.) adapted from a world centre NWP products.

A.2.2 Daily continental Rain Producing System prognosis (Tropical Storms, ITCz, Easterly waves, plus meaned fields of sfc and 200 mb stream function and velocity potential, stability parameters, etc.)

A.2.3 Weekly, Monthly and Seasonal Continental Climat Monitoring Outlooks per cent seasonal normal, mean heating and evaporation (10 day and monthly
(CMOs as per WMO CSMs for Tropical Regions)

A.3 Acquire, Operate and Maintain Meteorological Informatics and Data Systems, (ACMID)

A.3.1 Computer Communications Processing Services (LAN and Mainframe)

A.3.1.1 Systems analysis and programming services

A.3.1.2 Computer/Communications Operations

A.3.2 Remote Sensing Laboratory (HRPT, NOAA, METEOSAT, METEOR, TOVS, etc.) - Primary user display systems

A.3.3 Data Management Services

A.3.3.1 Quality Assurance, processing and archiving

A.3.3.2 Documentation, advice and delivery of data services (internal and external)

A.3.4 Advance Technology Maintenance Depot

A.3.4.1 Advanced Meteorological Data Acquisition Systems Technologist

A.3.4.2 Digital Electronics Engineering and Maintenance Technologist

A.3.4.3 Maintenance Laboratory Facility

E/ECA/ENV/34
Annex 3

United Nations Economic
Commission for Africa

World Meteorological Organization

DRAFT CONSTITUTION OF THE

AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR DEVELOPMENT (ACMAD)

November 1986

WHEREAS by its resolution 540 (XX) the Conference of Ministers of the United Nations Economic Commission for Africa on behalf of the Member States of the United Nations Economic Commission for Africa, resolved that an African Centre of Meteorological Applications for Development should be established for the purpose of improving the understanding of atmospheric and climatic processes over Africa, collecting, analyzing and disseminating meteorological and hydrological information, providing a meteorological watch and early warning system over Africa and promoting the training of African scientists and technicians in the application of meteorology for development;

WHEREAS practical and useful actions can presently be taken to alleviate the effects of drought and of other atmospheric phenomena by applying methodologies based on a thorough knowledge of the impact of meteorological factors on food production, on the availability of water resources and on new and renewable sources of energy;

WHEREAS by the said resolution 540 (XX) the African Centre of Meteorological Applications for Development is to be operated with the support of the Member States of the United Nations Economic Commission for Africa and of the World Meteorological Organization;

AND WHEREAS by virtue of the said resolution 540 (XX) the Member States of the United Nations Economic Commission for Africa have agreed to establish the African Centre of Meteorological Applications for Development for the purpose and in the manner set out in the preceding paragraphs;

NOW THEREFORE and on behalf of the Member States of the United Nations Economic Commission for Africa, **IT IS HEREBY AGREED AS FOLLOWS:**

ARTICLE 1

Establishment and membership of the Centre

1. The African Centre of Meteorological Applications for Development (hereinafter referred to as "the Centre"), is hereby established.

2. The Member States of the Centre shall be the Member States of the United Nations Economic Commission for Africa (hereinafter referred to as "the Member States").

ARTICLE 2

Objectives and Fundtions of the Centre

1. The objectives of the Centre shall be:

(a) To promote and develop the application of meteorological date and information so as to enhance the economic and social development of the Member States, assist in the investigation and mitigation of the effectss of weather phenomena, improve the knowledge of the anomalies of the weather and climate of the Member States and foster the proper conservation of the natural resources of the Member States;

(b) To assist the Member States to achieve self-sufficiency in food production, water resources management, and utilization of new and renewable sources of energy;

(c) To act as an African Centre of Excellence in meteorology and its application to development, and as a resource centre to stimulate applied scientific research, especially in tropical meteorology and in rain-producing systems, and to enrich existing training and development programmes;

(d) To strengthen national weather services to enable them to take full advantage of development opportunities offered by the Centre in support of the respective national economies in order to ensure the total development of the whole meteorological system of the Africa region in a harmonious manner;

(e) To develop those aspects of meteorology which are not catered for by the national and sub-regional centres, particularly in the areas

of acquiring and adapting agrometeorological techniques successfully applied elsewhere in aid of self-sufficiency in food production and energy; and to address the many pressing issues of drought and other climate/weather related disasters (such as floods, cyclones, storms, hurricanes, pest outbreak).

2. For the purposes set out in paragraph 1 of this Article, the Centre shall, in particular, perform the following functions:

(a) Strengthen the capabilities in the application and use of meteorological/climatological data;

(b) Provide a meteorological/climatological early warning watch system based on the state of the art for analysis and prediction;

(c) Develop new and practical methodologies for meteorological applications in order to:

(i) Reduce variability and risk of losses in food crop production;

(ii) Reduce costs and energy inputs in food crop production;

(iii) Increase production and strengthen food security;

(iv) Improve water resources management, especially in drought-prone and drought-stricken areas;

(v) Develop alternative renewable sources of energy;

(vi) Provide a better understanding of the atmospheric conditions prevailing in the Africa region which affect critical human activities;

(d) To perform on a continental scale to bridge the gaps between subregional

and national units through supporting activities in applications development, meteorological/climatological watch operations, numerical analysis and prediction development, and in informatics and satellite meteorology technology in order to identify and solve urgent regional climatic problems;

(e) The archiving of all historical and current data, provision of uniform data format, ensuring of efficient data/product exchange on existing Global Telecommunications System (GTS) and assist in defining new requirements;

(f) Provide regularly appropriate forecast of crop yields, identify appropriate methodologies for operational proposals, and meteorological conditions for the occurrence of migratory pests and diseases, and monitoring of continental drought and climatic anomalies;

(g) Provide training, including the organization of workshops, seminars, training missions, etc. for African scientists and technicians in the applications of meteorological data and information to economic and social development;

(h) Undertake research for the better understanding of the atmospheric and climatic processes which cause rains, drought, tropical cyclones and floods, storms and other significant meteorological phenomena; and

(i) Undertake such other activities as may be designed to further the objectives of the Centre.

ARTICLE 3

Headquarters of the Centre

1. The headquarters of the Centre shall be determined by the Conference of Ministers of the United Nations Economic Commission for Africa (hereinafter referred to as "the Conference of Ministers").

2. The Centre shall enter into an agreement with the host Government of the Member State where the headquarters of the Centre shall be established concerning the provision and grant, as the case may be, by the former of such adequate premises, facilities and services and privileges and immunities as may be required for the effective operation of the Centre.

ARTICLE 4

Organs of the Centre

The Centre shall have the following organs:

(i) A Board of Governors;

(ii) The General Directorate; and

(iii) Such other technical, scientific, financial and administrative bodies as may be necessary for the efficient discharge of its functions.

ARTICLE 5

The Board of Governors: composition, functions and meetings

1. The Board of Governors shall be the supreme policy-making organ of the Centre.

2. The Board of Governors shall be composed as follows:

(a) The Executive Secretary of the United Nations Economic Commission for Africa (hereinafter referred to as "the Executive Secretary") who shall be ex-officio Chairman of the Board of Governors, (OR A Chairman who shall be elected from among the members of the Board representing the Member States);

(b) The Vice-Chairman who shall be elected from among the members of the Board representing the Member States;

(c) A representative each of two Member States from each of the five subregions of the United Nations Economic Commission for Africa selected by the Conference of Ministers, each such representative shall be selected on the basis of his or her expertise and experience in meteorology;

(d) A representative of the Government of the (host country);

(e) A representative of the Organization of African Unity (OAU), without the right to vote;

(f) A representative of the World Meteorological Organization (WMO), without the right to vote;

(g) Representatives of international organizations or institutions interested in the activities of the Centre such as the United Nations Development Programme (UNDP), the Food and Agriculture Organization (FAO) and the United Nations Environment Programme (UNEP), by invitation of the Board of Governors without the right to vote;

(h) Donor agencies and eminent experts may also attend meetings of the Board of Governors by invitation of the Board as observers without the right to vote.

3. The Director-General of the Centre shall act as Secretary of the Board of Governors.

4. In selecting the members of the Board of Governors referred to in sub-paragraph (c) of paragraph 2 of this Article, the Conference of Ministers shall have regard t the necessity of maintaining a fair geographical distribution of selection among the Member States.

5. The members of the Board of Governors selected under subparagraph (c) of paragraph 2 of this Article shall hold office for a period of four years and may be eligible for re-election provided, however, that in making selections for the first time, the Conference of Ministers shall direct that one-half of the Member States selected by them shall retire two years after they have been selected and shall be replaced by the same number of Member States selected by the Conference of Ministers for the purpose.

6. The members of the Board of Governors referred to in subparagraph (c) of paragraph 2 of this Article, shall be persons who are competent and experienced in the activities of the Centre.

7. The Board of Governors shall:

(a) Prescribe the general principles and policies governing the operations of the Centre and give directives of a general nature as to the implementation of such principles and policies;

(b) Propose the work programmes of the Centre and their corresponding budgets, subject to the approval of the Conference of Ministers;

(c) Prescribe conditions for the admission of persons to undergo training provided by the Centre;

(d) Review and approve the annual reports of the DirectorGeneral of the Centre on the activities of the Centre;

(e) Appoint professionally qualified auditors to audit the accounts of the Centrte;

(f) Examine and approve the financial report and accounts of the Centre for the preceding year;

(g) Prescribe the financial, staff and other rules and regulations governing the administration of the Centre;

(h) Adopt its own rules of procedure;

(i) Determine, apart from the office of the Director-General of the Centre, the other offices of the Centre;

(j) Submit through its Chairman a report to the Joint InterGovernmental Regional Committee on Human Settlements and Environment of the United Nations Economic Commission for Africa (hereinafter referred to as "the Joint Committee"), for its consideration, approval and presentation to the Conference of Ministers, annual reports on the activities of the Centre;

(k) Appoint the Director-General and other senior staff of the Centre;

(l) Establish such technical, scientific, financial and administrative committees as may be necessary for the efficient discharge of the functions of the Centre;

(m) Convene periodically meetings of donors to consider the funding the activities of the Centre and;

(n) Perform such other funcxtions as may be necessary for the efficient discharge of the functions of the Centre.

8. The Board of Governors shall meet in ordinary session once a year and may hold extraordinary sessins at the request of its Chairman or of one-third of its members.

ARTICLE 6

The Chairman of the Board of Governors

1. The Chairman of the Board of Governors shall:

(a) Cause to be prepared the draft agenda of the meetings of the Board of Governors;

(b) Convene and preside over the meetings of the Board of Governors;

(c) With the approval of the Board of Governors, solicit financial and other resources from the United Nations and its specialized agencies or other inter-governmental organizations, governments, non-governmental organizations and other sources.

2. In the absence of the Chairman of the Board of Governors, the functions set out in paragraph 1 of this Article shall be performed by the Vice-Chairman.

ARTICLE 7

The General Directorate

1. The General Directorate shall be headed by the Director-General who shall be the Chief Executive and Administrative Officer of the Centre.

2. The Director-General of the Centre shall be appointed as provided for in this Constitution for a period of four years subject to renewal for succeeding periods of four years each.

3. The Director-General of the Centre shall act as the legal representative of the Centre.

4. Subject to such directions of a general nature as the Board of Governors may give, the Director-General of the Centre shall have responsibility for the planning, organization and direction of the technical activities, scientific research, training, advisory and other activities of the Centre. He shall in particular:

(a) Be responsible for the organization and administration of the centre;

(b) Submit for consideration of the Board of Governors the work programmes and corresponding budgets of the Centre;

(c) Be responsible for the carrying out of the activities of the Centre in accordance with the approved work programmes and corresponding budgets of the Centre;

(d) Submit for the approval of the Board of Governors annual reports on the activities and the accounts of the Centre;

(e) Subject to the staff and administrative rules and regulations of the Centre and to such directions as the Board of Governors may give, select and appoint staff other than those provided for under sub-paragraph (k) of paragraph 7 of Article 5 of this Constitution;

(f) Establish and maintain such contacts with Governments, the United Nations and its specialized agencies and other organizaitons or institutions as may be necessary or desirable for the achievement of the objectives of the Centre;

(g) Undertake such other assignments or activities as may be determined by the Board of Governors.

5. The Director-General and the other staff of the Centre shall neither seek nor accept any instructions, remunerations or gifts from any government or authority or from any source external to the Centre and shall refrain from any other acxtion which might reflecxt on their position as international officials.

6. The Member States undertake to respect the international character of the responsibilities of the Director-General and other staff of the Centre and not to seek to influence any of their nationals in the discharge of such responsibilities; provided that this shall not preclude the secondment to the Centre of staff by Governments or organizations.

ARTICLE 8

Status, capacity, privileges and immunities

1. To enable it to achieve its objectives and perform the functions with which it is entrusted, the Centre shall possess in the territory of each Member State juridical personality in international law. To these ends, the status, capacity, privileges, immunities and exemptions set forth in paragraphs 2 to 12 of this Article shall be accorded to the Centre in the territory of each Member State.

2. The Centre shall for the purposes of this Constitution have the capacity:

(a) To enter into contracts;

(b) To acquire and dispose of immovable or movable property; and

(c) To institute legal proceedings.

3. The Centre, its property and assets shall enhoy immunity from every form of legal process except insofar as in any particular case it has, through the Director-General of the Centre, expressly waived its immunity;

Provided however that no measure of execution shall be taken against the property and assets of the Centre without the consent of the Direcxtor-General of the Centre.

4. The headquarters of the Centre shall be inviolable. The property and assets of the Centre shall be immune from search, requisition, confiscation, expropriation, and any other form of interference whether by executive, administrative judicial or legislative action.

5. The archives of the Centre, and in general all documents belonging to it or held by it, shall be inviolable.

6. The Centre, its property, assets, income and transactions shall be exempt from all taxation and from customs duties and prohibitions and restrictions on imports and exports necessary for the exercise of its functions. The Centre however shall not be exempt from the payment of charges for services rendered.

7. The members of the Board of Governors and representatives of the Member States who are not otherwise officials of the United Nations or of the specialized agencies of the United Nations, shall enjoy such privileges and immunities as are provided for mutatis mutandis by Article IV of the Convention on Privileges and Immunities of the United Nations.

8. The staff of the Centre who are not otherwise officiels of the United Nations or of the specialized agencies of the United Nations shall enjoy such privileges and immunities as are provided for by Article V of the Convention on Privileges and Immunities of the United Nations.

9. Without prejudice to the foregoing provisions, the Member States undertake to accord to all representatives of the Member States, all the staff of the Centre and experts providing advice or assistance to the Centre, such facilities and courtesies as are necessary for the exercise of their functions in connection with the Centre.

10. The Director-General of the Centre shall have the right and duty to waive the immunity of any staff of the Centre who is not an official of the United Nations or of a specialized agency of the United Nations, in cases where in his opinion the immunity would impede the cause of justice and can be waived without prejudice to the interests of the Centre.

11. All persons undergoing training or taking part in a scheme for the exchange of personnel at the Centre in pursuance of the provisions of this Constitution and who are not nationals of the Member States concerned, shall have the right of entry into, sojourn in, transit through and exit from the territory of each Member State when such entry, sojourn, transit or exit is necessary for their assignment. They shall be granted facilities for speedy travel; visas, where required, shall be granted promptly and free of charge.

12. The Centrte shall co-operate at all times with the appropriate authorities of the Member States to facilitate the proper administration of justice, secure the observance of national laws and prevent the occurrence of any abuse in connection with the privileges, immunities and facilities mentioned in this Article.

ARTICLE 9

Obligations of Member States

The Member States shall co-operate in every way so as to assist the Centre in achieving its objectives. They shall in particular:

(a) Facilitate the timely collection, exchange and dissemination of climatic and meteorological data and information;

(b) Submit such reports, data and information as may be required by the competent organs of the Centre;

(c) Make available to the Centre training and research facilities on such terms and conditions as may from time to time be agreed with the appropriate organs of the Centre;

(d) Make available to the Centre national personnel on such conditions as may be agreed upon with the appropriate organs of the Centre;

ARTICLE 12

Resources of the Centre

1. The Centre shall derive its finances from contributions made by the Member Sttes as determined by the Conference of Ministers.

2. The Centre may derive further resources in cash or in kind from the United Nations and its specialized agencies, and such other institutions and organizations as may be interested in the activities of the Centre. Acceptance by the Centre of offers of such further assistance shall be consistent with the objectives of the Centre, subject to the provisions of this Constitution and be in accordance with the relevant provisions of the rules governing the financial management of the Centre.

ARTICLE 13

Amendments

This Constitution may, on the recommendation of the Joint Inter-Governmental Committee on Human Settlements and Environment be amended by the Conference of Ministers.

ARTICLE 14

Settlement of Disputes

Any question in dispute that may arise concerning the interpretation or application of any provision of this Constitution which cannot be settled by the parties concerned, shall be determined by the Board of Governors.

ARTICLE 15

Termination

1. This Constitution shall be of indefinite duration except that it may be terminated by a decision of the Conference of Ministers whereupon the Centre shall be deemed to have been dissolved.

2. In the case of the dissolution of the Centre in pursuance of the provisions of paragraph 1 of this Article, the Board of Governors shall make provisions for the orderly liquidation of the Centre.

ARTICLE 16

Entry into Force

This Constitution shall enter into force upon its adoption by the Conference of Ministers.

Burundi	Mr. Kayengeyenge; Représentant Peranent du Burundi auprès de l'OMM Directeur Général de l'Institut Géographique du Burundi (IGEBU) B.P. 331 - BUJUMBURA
Egypt	Mr M.A. El Sukary Director of Technical Co-operation Division Egyptian Meteorological Authority P.O. Box 11784 CAIRO
Ethiopia	Mr W: Degefu; President RA I, Permanent Representative of Ethiopia with WMO and General Manager Meteorological Services Agency P.O. Box 1090 ADDIS ABABA
Kenya	Mr: Evans A. Mukolwe Ag. Deputy Director Kenya Meteorological Department P.O. Box 30259 NAIROBI
Malawi	Mr. B.K. Mlenga Permanent Representative of Malawi with WMO Director, Meteorological Department P.O. Box 2 CHILEKA
Mali	Mr: K. Konare Représentant Permanent du Mali auprés de l'OMM Directeur de la Météorologie Nationale B.P. 237 BAMAKO

Overseas Development Administration

Dr: Denis G. Osborne
Head of Eastern Africa Department

Mr. Stanley G. Cornford
Assistant Director
International Planning
Meteorological Service
United Kingdom

ECA	Dr. N.H. Ayodele Cole Chief, Environment Section, SDEHS/Division
	Mr: N.M. Masemola Senior Legal Officer, Economic Cooperation Office (ECO)
UNESCO	D. Kwame A. Tuffuor Regional Hydrologist for Africa and Programme Specialist for Water Sciences B.P. 331 DAKAR, SENEGAL
UNDP	Mr: H: Van der Kloet Resident Representative UNDP BUJUMBUR
	Mr. W: Meyer Junior Professional Officer BUJUMBURA
WMO Consultants	Mr. M.W. Balshaw Consultant Study Team Leader and Operational Meteorology Regional Director AES - CANADN
	Mr. B.C. Biswas Consultant Study Team (Agrometeorology) Director of Agrimeteorology INDIA
WMO	Mr. S. Chacowry Director, WMO Regional Office for Africa BUJUMBURA
	Mr. H. Diallo Chief, Africa Division Technical Cooperation Department WMO - GENEVA
	Mr. A.O. Babiker Regional Officer WMO Regional Office for Africa BUJUMBURA